# THE IRON TRADE REVIEW

VOLUME XXXVI CLEVELAND, OHIO, MAY 7, 1903 NUMBER 19

## THE WEEK IN IRON CIRCLES.

### THE MARKET AT LARGE.

Current activity in the iron trade does not furnish a proper gauge of underlying conditions. The halt in buying in one important department, the foundry industry, more or less colors the entire situation. The steel end of the market continues strong; but there is a general desire, even in lines not directly affected, to see the outcome in pig iron. Already the wait on the part of pig iron buyers, prolonged throughout April, has shown itself in the Lake Superior ore market, where sales have been almost unprecedentedly light for the spring months, the recent heavy chartering of vessels being very largely for interests mining their own ore. The gradual disappearance of the unparalleled freight and fuel difficulties of months has been taken in some quarters as an indication that reactionary tendencies were already at work, on the assumption evidently that the pinch of railroad tie-ups, rather than proper dispatch, is the normal condition. The disappearance of high prices for prompt coke, prompt pig iron and prompt finished materials of some descriptions, particularly plates, has contributed to the waiting attitude of many buyers. Meantime there is not a little difficulty in estimating the relation of production and consumption. Labor questions have introduced an element of uncertainty. Securities have declined for several months; pig iron has declined; and in finished material, with premiums disappearing, the top has been seen. Yet these conditions are accompanied by demands for very considerable advances in wages, with shortening of hours, making new and important increments to manufacturing costs. Generally the concessions are being made; but the consumer who must pay it is yet to be heard from. The disposition among pig iron producers appears to be to let the market drift. Associated Southern furnaces are not meeting the prices of outside producers, which have touched $16 at furnace for No. 2 iron, this price having been named on Central Western business. Little business results, and the indications are that contracts when placed will not be for long periods. The scrap market is generally lower in response to the course of foundry and forge irons, but large buying is unknown. Bessemer iron has sold to the extent of 15,000 to 20,000 tons in the Pittsburg market, and for second half delivery $19.40 at Valley furnace is the basis of some transactions. The steel market shows strength with considerable inquiry which has not been taken care of. A 10,000-ton import contract is pending on a $29 basis, seaboard, for German basic Bessemer. Western interests are still in the market. At Pittsburg Bessemer billets have sold at $31.50 to $32. In steel bars considerable business has been done in the West, Chicago reporting sales of 20,000 tons. Large buying is yet to come. Bar iron specifications in April were less than in the corresponding month last year, and there is no new buying in large lots at present. Sales of rails keep up and in light rails especially the demand has been active, orders exceeding considerably the current production. The easing of the situation as to coke is reflected in shipments of 302,000 tons a week in the upper and lower Connellsville districts, as against an average of 271,000 tons a week last year.

### PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, May 6

Middlemen have been quite industrious in trying to find weak spots in the pig iron market and it is known that here and there Southern furnaces have been found that were willing to make concessions from the official schedule for Pittsburg delivery. Northern furnaces have held aloof and assert it is simply a waiting game between producers and actual consumers. The lowest price we can learn on Bessemer on contract was $19.40 at Valley furnace, deliveries running July to December, although a small lot of prompt Bessemer seems to have been sacrificed at $19, valley. Furnaces are well sold up for three or four months, and propose to wait. The steel corporation, which was in the market some time ago, and withdrew because asked too high a figure, will doubtless be a buyer should the market go lower.

The recent flurry was induced by the return of normal conditions in the movement of coke, the blockade having lasted so many months as to create an impression that a blockade, rather than a free movement, was the true normal condition. Spot prices for furnace have dropped from $6 and $7 to $4, and possibly a little lower. There is a possibility that with the ore and grain movement on in full force another coke blockade may result, but the expectation of furnaces is that conditions will be easy through the good weather.

Additions to blast furnace capacity include the first Clairton furnace, blown in two weeks ago, with two others to follow shortly; a furnace at Steubenville, blown in about ten days ago; with additional capacity to be added this month at Toledo; and furnaces at Cleveland and Detroit expected to be ready in July; while additional capacity at Buffalo is expected shortly. Outside of these new furnaces several furnaces out for some time for repairs, are coming in again. Altogether, however, early additions to furnace capacity are not large, and as the stringency during the winter was due not to lack of furnace capacity, but an insufficient supply of coke, it does not follow that an unlimited additional furnace capacity means an equal increase in actual pig iron production. Shipments from the upper and lower Connellsville regions for the whole of last year averaged 271,873 tons per week, while production in these regions the past three weeks has averaged about 302,000 tons a week, showing an increase of 11 percent only, so that it is rather far-fetched to base claims of progressive weakness in the market on a glut of coke.

Steel continues in excellent demand, and what are really fancy prices continue to be paid. Importers have been unable to get into the market, as German mills are quite stiff in their demands.

All finished lines are firm in price, and show no tendency to go below the base prices which have been in force so long. There is, on the other hand, a notable absence of the premiums which were the rule at this time a year ago. Premiums on plates, instead of increasing as summer approaches, as they did last year, are disappearing, only very

small lots now commanding a premium. Structural shapes are being delivered satisfactorily, although mills are full of specifications. The easiness in steel bars is due to the fact that the selling of mills must cover practically the entire consuming trade, whereas last summer the bulk of the business had been corralled at $2 a ton below the price which was subsequently maintained.

**Pig Iron.**—There is scarcely any demand for foundry iron. A number of comparatively small sales, running from carloads to a few hundred tons each, have been made in the past week, of Northern iron, prices ranging from $21.50 to $22 for No. 2 at Pittsburg. On regular contracts it is probable $21 could be done, but we hear of no lower figures. Associated Southern furnaces are adhering to the official price of $21.35, delivered Pittsburg, for No. 2, but are not selling any iron of consequence. It is claimed that the official price on foundry can be shaded 25 to 50 cents a ton, but if this is true it has not led to sales, but has rather scared buyers off. Forge is now quiet, local consumers having bought all they needed last month, at $19.85, Pittsburg, transactions in Southern for the month being about 15,000 tons for this district. We note sales of Valley Bessemer during the week aggregating 15,000 to 20,000 tons, the lowest price done being $19.40, valley furnace, or $20.25, Pittsburg, for iron July to December, barring a small lot of prompt already noted. For third quarter prices have run as high as $19.65. On a good round tonnage for second half it is possible $19.25 at Valley furnace could be done, but this is regarded as the minimum of the market, with furnaces willing to wait until buyers are ready. The Eastern pig iron market is decidedly easier, owing to a number of small furnaces being in good trim again, and Eastern iron can penetrate farther west than for some time, at least as far as Harrisburg. This condition may change if Eastern furnaces in the future have more of the market to themselves, through the decline in imports. Yet this decline may be farther off than expected since pig iron imports increased from 45,000 tons in February to nearly 60,000 tons in March, April figures of course not being available. We revise quotations as follows:

| | |
|---|---|
| Bessemer, Valley | $19 40 to 20 00 |
| Bessemer, Pittsburg | 20 25 to 20 85 |
| No. 1 Foundry | 22 00 to 22 50 |
| No. 2 Foundry | 21 25 to 21 75 |
| Gray Forge, Pittsburg | 19 85 to 20 35 |
| Chilled Basic, Valley | 19 50 to 20 00 |
| Chilled Basic, Pittsburg | 20 35 to 20 85 |

**Steel.**—There is an excellent demand for small lots for prompt and nearby shipment, and the market is very strong for such deliveries, there being no interest in protracted deliveries through the second half. We note sales of small lots of Bessemer billets at from $31.50 to $32, delivered Pittsburg, while $31 could probably be done at Valley mill. Open-hearth billets are 50 cents to a dollar higher than Bessemer, depending on carbon. The Valley mill which intended to shut down July 1 to install a new billet mill may defer the change until later in the summer, on account of the pressure for steel, but the stoppage will occur before cold weather. A leading local producer with recently increased blooming capacity will now have a little steel for the open market, which will preferably be marked in sizes larger than 4x4. Wire rods are very firm at $37 to $38, Pittsburg, for Bessemer or open-hearth.

**Ferro-Manganese.**—The market is in the hands of the English furnaces, German furnaces being too high and domestic furnaces having none for the open market. We quote at $52.50 for 80 percent in small lots, down to $50 in large lots, delivered.

**Muck Bar.**—The market is very quiet, consumers being covered and producers well filled up. Some mills quote $35.50 for best local grades, but $35 could probably be done.

**Skelp.**—Skelp is very scarce, especially steel, and prompt deliveries are very hard to get, producers being sold to July and even farther ahead. We quote grooved skelp, either iron or steel, at 2.05c to 2.10c, and sheared at 2.10c to 2.15c, the higher price being for early delivery.

**Rails and Track Material.**—Rail business for steam roads has been wound up for the year, the mills being filled up to December, with the prospect of carrying over considerable tonnage. On trolley and light rails there is some unsold capacity yet. We quote: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; light rails, 8 pounds in carload lots, $39; less than carload lots, $40; 12, 16 and 20 pounds, $36; 25 to 40 pounds, $36. Track materials: Spikes, 2.15c to 2.20c; track bolts, square heads, 2.05c; hexagon heads, 2.65c; fish plates, 1.60c on orders accompanying large rail contracts, otherwise 2c to 2.10c is asked.

**Plates.**—Mills are well filled with business clear through the summer, besides long time contracts running through this year and into next year. Demand for prompt plates on new orders is not heavier, as buyers took precautions this year to buy ahead, and mills are taking care of their regular customers at the official prices. Some odd lots for early shipment command premiums of $2 to $4 a ton. Official prices remain: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.75c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plate more than 100 inches, 5c extra 100 pounds. Plates 3-16 of an inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5c extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

**Pipes and Tubes.**—No large orders have been placed the past week, but the volume of small orders totals up well, and current booking is fully equal to the current output. Steel pipe is really quite scarce, there being considerable complaint about deliveries. The pipe for the proposed new natural gas line from West Virginia to Pittsburg will call for 80 miles of 20-inch pipe, but has not been placed yet. We quote official prices as follows, in carload lots to consumers, f. o. b. Pittsburg, plus freight according to Tube Rate Book to destination:

MERCHANT PIPE.

| | Steel Pipe. Black. Percent. | Steel Pipe. Galv. Percent. | Wrought Iron Pipe. Black. Percent. | Wrought Iron Pipe. Galv. Percent. |
|---|---|---|---|---|
| ⅛, ¼ and ⅜ inch | 68 | 58 | 65 | 55 |
| ½ inch | 70 | 60 | 67 | 57 |
| ¾ to 6 inch | 75 | 65 | 72 | 62 |
| 7 to 12 inch | 69 | 59 | 66 | 56 |
| *Plugged and Reamed* | | | | |
| 1 to 4 inch | 73 | 63 | 70 | 60 |
| *Cut 3 to 6 feet* | | | | |
| ⅛, ¼ and ⅜ inch | 63 | 52 | 60 | 49 |
| ½ inch | 65 | 54 | 62 | 51 |
| ¾ to 6 inch | 71 | 60 | 68 | 57 |
| 7 to 12 inch | 65 | 53 | 61 | 50 |
| *Cut 6 feet and longer* | | | | |
| ⅛, ¼ and ⅜ inch | 64 | 53 | 61 | 50 |
| ½ inch | 66 | 55 | 63 | 52 |
| ¾ to 6 inch | 72 | 61 | 69 | 58 |
| 7 to 12 inch | 66 | 54 | 62 | 51 |
| *Extra Strong Plain End* | | | | |
| ⅛ to 8 inch | 67 | 57 | 63 | 53 |
| Threads only | 66 | 56 | 62 | 52 |
| Threads and Couplings | 65 | 55 | 61 | 51 |
| *Double Extra Strong Plain End* | | | | |
| ½ to 8 inch | 59 | 49 | 55 | 45 |
| Threads only | 58 | 48 | 54 | 44 |
| Threads and Couplings | 57 | 47 | 53 | 43 |

NOTE.—Orders for less than carload will be charged at 12½ percent advance. Extra and Double Extra Strong Cut Lengths, lower random discounts by 10 percent net for 6 feet and longer, and 15 percent net for 3 to 6 feet.

BOILER TUBES.

*Steel.*

| | Percent. |
|---|---|
| 1 to 1½ inches | 45 |
| 2¼ to 5 inches | 62½ |
| 1¾ to 2¼ and 6 to 13 inches | 52½ |

*Iron.*

| | Percent. |
|---|---|
| 1 to 1½ inches | 36½ |
| 2¼ to 5 inches | 46½ |
| 1¾ to 2¼ and 6 to 13 inches | 35½ |

CASING.

| | S. and S. Percent. |
|---|---|
| 2 to 3 inches | 58 |
| 3¼ to 4 inches | 60 |
| 4¼ to 12½ inches | 63 |

**Bars.**—Specifications on steel bars are good, but there is little business being done ahead, since there is no incentive. Mills are quite well filled with business, but are making prompt deliveries. Iron bars are being shaded for Western delivery, as has been the case for several months, while the local market is reported very firm at 1.89¾c, de-

livered Pittsburg. We note several sales the past week at this price. We quote: Bessemer steel bars, 1.60c; open-hearth, 1.70c; plow beams and cultivator beams, 1.60c, net; channels, angles, zees and tees, Bessemer under 3 inches, 1.70c; over 3 inches, 1.80c; bar iron, 1.85c, Youngstown, or 1.89¼c, Pittsburg, with freight added to point of delivery from Youngstown. Hoops and bands are quoted at 1.90c, full extras, in 250-ton lots and over, and 2c in less than 250-ton lots.

**Structural Material.**—Mills have caught up pretty well on deliveries. Very few new contracts are being placed with mills, as bridge and building companies have season contracts, but they are taking good orders for new erection this summer, better than for several weeks, and are putting in specifications freely. The situation is much brighter since it is settled that there will be no serious labor disturbances in this trade. We quote as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

**Sheets.**—There are no further rumors of an advance in the official price of sheets. Business is a little better from the jobbing standpoint, as the labor outlook is improved. The leading interest seems to be about filled up for the next three months. Outside mills are quoting higher than official prices in most cases, but it is understood are taking care of their regular trade at base prices. For prompt carloads the market stands 2.80c to 2.85c for black, No. 28 gauge, and 3.90c to 3.95c on galvanized. On contracts for 500-bundle lots and over we quote regular prices as follows: No. 28, 2.75c; No. 27, 2.65c; No. 26, 2.55c; Nos. 22 and 24, 2.45c; Nos. 18 and 20, 2.35c; Nos. 14 and 16, 2.25c; Nos. 10 and 12, 2.10c to 2.15c. Galvanized: No. 16, 2.60c; No. 18, 2.85c; No. 26, 3.35c; No. 27, 3.60c; No. 28, 3.85c; No. 29, 4.35c; No. 30, 4.50c.

**Wire and Wire Nails.**—The movement in both wire and wire nails is quite satisfactory for the season, and prices are being firmly held. We quote: Wire nails, carload lots, to jobbers, f. o. b. cars, Pittsburg, $2; plain wire, carload lots, $1.90; barb wire, carload lots, $2.30; staples, carload lots, $2.20. Galvanizing, 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Steel cut nails are quoted as follows: Carload lots, $2.15, and less than carload lots, $2.20, f. o. b. Pittsburg, plus freight to point of destination. Iron cut nails are $2.25 in carload lots and $2.30 in less than carload lots. Terms, 60 days, less 2 percent off in 10 days.

**Merchant Steel.**—There is a good running demand and prices are firmly held. We quote: Turned cold rolled and ground shafting, 47 off in carload lots and 42 percent off in less than carload lots; tire steel, 2.15c to 2.25c; spring steel, 2.25c to 2.35c; toe calk, 2.30c to 2.40c. The following differentials maintain: Less than 2,000 pounds of a size and not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance. Tool steel is quoted 7 cents and upwards, according to the grade.

**Spelter.**—The market is very firm and prime Western grades are about 5.63½c, Pittsburg, for prompt and 5.58½c for future.

**Old Material.**—The market has been extremely quiet, there being an absence of demand from all quarters, consumers being well covered and waiting to see if the market will yield. New melting stock of course is in good demand, the leading interest buying about all that is offered, at around $22. We quote prices as follows: Heavy melting stock, $21.50 to $21.75; low phosphorus melting stock, $25 to $25.50; steel rails, $21 to $21.25; re-rolling rails, $22.50 to $23; No. 1 cast scrap, $19 to $19.25; borings, $11 to $11.50; busheling scrap, $17 to $18; old iron rails, $24.50 to $25; turnings, $14.50 to $15.

**Coke.**—Considerable coke is being offered for resale by furnaces which bought more than they needed, when there were poor chances of getting deliveries. Spot furnace coke can be had at $4 at ovens, and possibly lower, round lots going at about $3.65 for nearby shipment. On contract for second half the price is nominally $3.50, but there is no buying, and if the coke movement continues good furnaces not yet covered may do a little better. Foundry coke is $4.50 to $5 for prompt, at ovens. Production for the week ending April 25 was 251,000 in the upper Connellsville region, and 51,320 tons in the lower Connellsville region, the latter being the record to this time.

## CHICAGO.

OFFICE OF *The Iron Trade Review*,
519 MONADNOCK BLOCK, May 5

The iron and steel market shows no material change. Quietness pervades nearly all lines and buying is of a desultory character. The general impression prevails that no active movement will set in before June 1, and sellers are not at all anxious over the situation. Prices are firm, the market having an underlying strength greater than is credited to it by many buyers. The labor situation in this city and the West is an element that enters strongly into the calculations of manufacturers for their requirements, and at the present time the outlook is unsatisfactory. Demands for shorter days with no reduction in wages have been made by the molders, machinists, blacksmiths, metal workers and others, and conferences are now in progress. Until these questions are settled many consumers will not buy for more than their immediate wants.

The principal feature of the week's trading is the weakness in scrap, which is from 50 cents to $1 a ton lower in values since our last report. The light buying of pig iron, bar iron and steel is largely responsible for this drop, the demand for old material having fallen off in proportion. There has been some buying of steel bars for season's requirements, the aggregate tonnage sold amounting to about 20,000 tons. Standard and light rails have been active, and some sales of plates have been made for October and November delivery. Merchant pipe and wire products are in good demand, but for other forms of finished material, there is little inquiry. Pig iron maintains its past condition, carload orders predominating.

**Pig Iron.**—Buyers are still holding aloof, waiting for the further concessions which they believe must come Sellers argue that it is doubtful if prices will go below $16.50 for No. 2 foundry at Birmingham, which quotation is being made by several non-association furnaces; and lower quotations have been reported. Rumors of cut prices have become so common that one furnace has instructed its agent to make no more quotations for the present in this market, believing that this attitude will bring a buying movement sooner than quotations on inquiries that as a rule do not mean business. Buying has been light during the week, inquiries being mainly for carload lots. A few 100 and 200-ton orders have been placed, and one for 500 tons of Northern No. 2 foundry, making on the whole a respectable tonnage. The Pullman inquiry for 3,000 tons of Nos. 2 and 3 foundry, which has been in the market several weeks, has not yet been placed. The demands of the molders in Cook County for a nine-hour day with no reduction in wages has practically been granted them, though the agreement has not been signed. The ratification has been postponed for two weeks, pending which the men are to continue at work. We have revised our quotations on malleable and standard Bessemer, and quote as follows:

| | |
|---|---|
| Lake Superior charcoal | $24 00 to 25 00 |
| Local Coke Foundry No. 1 | 22 00 to 22 50 |
| Local Coke Foundry No. 2 | 21 50 to 22 00 |
| Local Coke Foundry No. 3 | 21 00 to 21 50 |
| Local Scotch Foundry No. 1 | 22 00 to 22 50 |
| Southern Coke No. 1 | 21 35 to 22 35 |
| Southern Coke No. 2 | 20 85 to 21 85 |
| Southern Coke No. 3 | 20 35 to 21 35 |
| Southern Coke No. 4 | 19 85 to 20 85 |
| Southern No. 1 soft | 21 35 to 22 35 |
| Southern No. 2 soft | 20 85 to 21 85 |
| Southern Gray Forge | 19 85 to 20 35 |
| Southern Silveries (4% to 5% silicon) | 22 85 to 23 85 |
| Southern Silveries (5% to 6% silicon) | 23 35 to 24 35 |
| Jackson Co. Silveries (6% to 8% silicon) | 29 30 to 30 30 |
| Ohio Strong Softeners | 24 00 to 24 50 |
| Alabama and Georgia Car Wheel | 28 35 to 29 35 |
| Malleable Bessemer | 21 50 to 22 00 |
| Standard Bessemer | 21 50 to 22 00 |
| Basic iron | 22 35 to 23 85 |

**Bars.**—Several implement manufacturers have placed contracts in the past week for their yearly requirements of steel, amounting in all to about 20,000 tons. Buying of bar iron has been light and specifications have fallen off.

The present weakness in this product is illustrated by the statement of one producer that the specifications it received last month were 14,000 tons less than they were in April of 1902. We quote mill shipments, Chicago delivery, as follows: Bessemer steel, 1.76½c; angles, less than 3 x 3, 1.86½c, base; hoops in lots of 250 tons and greater, 2.06¼c; less than this amount, 2.16½c; iron, 1.85c to 1.90c, though on large lots it undoubtedly can be shaded. Prices on lots from store are as follows: Steel, 2c to 2.10c; iron, 2.15c to 2.20c; hoops, 2.40c to 2.50c; angles 2.25c rates.

**Sheets.**—Buying has been light both for mill shipments and from store, which is attributed largely to the uncertainty regarding the outcome of the conferences between metal workers and their employes on the latter's demands. We quote mill shipments, carload lots, Chicago delivery: Black sheets, No. 27, 2.86½c to 2.96½c; No. 28, 2.96½c to 3.01½c. Galvanized 75 and 5 percent. On lots from store, we quote No. 27 black, 2.95c to 3c; No. 28, 3.05c to 3.10c. Galvanized 75 and 2½ percent.

**Structural Steel.**—Demand is light, sales of small lots only being recorded. We quote mill prices, Chicago delivery: Beams and channels, 16 inches and under, 1.75c to 2c; 18 inches and over, 1.85c to 2.10c; universal plates, 1.75c to 2.10c, according to delivery; angles, 3 x 3 and larger, 1.75c to 2c; tees, 3 x 3 and larger, 1.80c to 1.90c; zees, 1.75c to 1.95c. The maximum quotations are asked by some mills and dealers on lots for quick shipment. Store trade is quoted at 2¼c to 2½c per pound.

**Plates.**—Mills report several large sales for delivery in October and November. Earlier than this, nothing can be promised. We quote mill prices, Chicago delivery: Tank steel, ¼-inch and heavier, 1.90c to 2c; flange steel, 2c to 2.10c. The official price of 1.75c remains unchanged, though material cannot be bought at this figure in this market. Prices for lots from stock: Tank steel, ¼-inch and heavier, 2.15c to 2.25c; 3-16, 2.25c to 2.35c; No. 8, 2.30c to 2.40c; No. 10, 2.35c to 2.45c; flange steel, 2.40c to 2.50c.

**Rails and Track Supplies.**—A good business has been done in both standard and light rails in the past week. The leading local producer of light rails reports that its sales of this product in April amounted to twice the tonnage it could turn out. We quote heavy sections, 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; light rails, 45 pounds, $34 to $35; 12 pounds, $39 to $40, with regular differentials for intermediate size. Track supplies, mill shipments: Angle bars, 2c to 2.10c; spikes, first quality, 2.25c (out of store, carload lots, 2.35c to 2.45c rates); second quality, 2.10c; track bolts, 3½x¾, with square nuts, 2.85c to 3c per 100 pounds; with hexagon nuts, 3.05c to 3.15c, with usual differential for other sizes.

**Merchant Steel.**—Several contracts have been placed during the week by implement manufacturers for their yearly requirements, though the tonnage is not of large proportions. We quote mill shipments, Chicago delivery, as follows: Spring steel, 2.65c to 2.75c; sleigh shoe, 1.95c flat sizes; concave and convex, 2c; out of store, 2.15c; cutter shoe, 2.50c to 2.60c; machinery steel, 2.15c to 2.25c base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.30c to 2.40c; out of stock, 3c to 3.10c; ordinary tool steel, 6c to 7c; specials, 13c and upwards; less than carload lots, 5 to 10 percent higher; cold rolled shafting, carload lots, 47 percent off; less than carload lots, 42 percent off.

**Merchant Pipe.**—Inquiry is fairly brisk, and on large sizes mills are sold far ahead. We quote, carload lots, mill shipments, random lengths, f. o. b. Chicago, as follows:

| | Steel Pipe. | | Guaranteed Wrought Iron Pipe. | |
|---|---|---|---|---|
| | Black. Percent. | Galv. Percent. | Black. Percent. | Galv. Percent. |
| ⅛ to ¾ in. inclusive | 66.35 | 56.35 | 63.35 | 53.35 |
| ½ inch | 68.35 | 58.35 | 65.35 | 55.35 |
| 7 to 12 inches, inclusive | 67.35 | 57.35 | 64.35 | 54.35 |

Less than carload lots, 12½ percent advance over above prices.

**Boiler Tubes.**—Buying has been brisk, both mills and jobbers reporting the demand as being very satisfactory. Our quotations below are on carload lots, mill shipments, f. o. b. Chicago. On less than carload lots, from mill, 12½ percent is to be added:

| | L. W. Steel Percent. | C. C. Iron Percent. |
|---|---|---|
| 1 to 1¼ in. | 43.35 | 38.35 |
| 1¼ to 2½ in. | 55.85 | 35.85 |
| 2¾ to 5 in. | 60.85 | 45.85 |
| 6 to 13 in. | 55.85 | 35.85 |

For lots direct from warehouse stock:

| | L. W. Steel Percent. | C. C. Iron Percent. |
|---|---|---|
| 1 to 1¼ in. | 40 | 35 |
| 1¼ to 2½ in. | 50 | 32½ |
| 2¾ to 5 in. | 57½ | 42½ |
| 6 to 13 in. | 50 | 32½ |

**Cast Iron Pipe.**—No large lots have been placed, orders and inquiries being limited to the usual run of small lots. We quote f. o. b. Chicago, carload lots, 4-inch water pipe, $34; 6-inch, $33; 8-inch and upwards, $32; gas pipe $1 a ton higher. On large orders these prices can be shaded.

**Billets and Wire Rods.**—Demand is very quiet, owing to the impossibility of securing satisfactory deliveries. German mills are sold up to the end of the third quarter, and domestic manufacturers are in most cases sold up for a longer period than this. If deliveries could be made, a large tonnage could soon be placed. We quote German basic Bessemer billets, seaboard, $29.50 to $30; open hearth billets for use in rolling mills, $34 to $36; for foreign purposes, $36 to $40; wire rods, $40.

**Wire and Wire Nails.**—Demand continues very heavy, though the fact that farmers are in the midst of seeding time has decreased consumption. Jobbers, however, are taking advantage of the interval to replenish their depleted stocks, and mills are hard pressed for prompter shipments. We quote prices to jobbers, Chicago delivery, as follows: Wire nails, carload lots, $2.20; less than carload lots, $2.30. Cut nails, steel, carload lots, $2.26½; less than carload lots, $2.36½. Plain wire, $2.10 carloads, and $2.20 in smaller lots; galvanized, carloads, $2.40; smaller lots, $2.50. Barbed wire, carloads, $2.50; less than carloads, $2.60; galvanized, carloads, $2.80; less than carloads, $2.90. Staples, carloads, $2.30; smaller lots, $2.40; galvanized, carloads, $2.60; smaller lots, $2.70. Bale ties, 85 percent discount f. o. b. Waukegan on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or DeKalb, with actual freight allowed not exceeding 50 cents per 100 pounds.

**Coke.**—In sympathy with the pig iron market, demand for coke has fallen off considerably. Ovens are shipping a plentiful supply into this market, and there is no difficulty in obtaining prompt shipment. We quote Connellsville 72-hour coke, $5 at the ovens—$7.65 Chicago. Southern coke is offered at slightly lower prices.

**Old Material.**—There has been quite a slump in prices during the past week, averaging on all products 50 cents to $1 a ton. The fact that mills are stocked up with material, together with the weakness in pig iron and bar iron, is largely responsible for the fall in prices. It was not unexpected by local sellers, as the demand and cost of old material is usually in sympathy with pig iron and bars. We have revised our quotations, and quote gross tons as follows:

| | |
|---|---|
| Old iron rails | $23 00 to 23 50 |
| Old steel rails (mixed lengths) | 17 00 to 17 50 |
| Old steel rails (long lengths) | 21 50 to 22 00 |
| Relaying rails | 31 50 to 32 00 |
| Old wheels | 22 50 to 23 00 |
| Heavy melting steel | 17 00 to 17 50 |
| Mixed country steel | 14 50 to 15 00 |

The following are selling prices per net ton:

| | |
|---|---|
| No. 1 R. R. wrought | 19 00 to 19 50 |
| No. 2 R. R. wrought | 17 50 to 18 00 |
| Shafting | 18 50 to 19 00 |
| Dealers' forge No. 1 | 16 00 to 16 50 |
| No. 1 busheling and wrought pipe | 13 50 to 14 00 |
| No. 1 cast | 16 00 to 17 00 |
| Railway malleable | 15 50 to 16 00 |
| Country malleable | 14 50 to 15 00 |
| Iron axles | 23 00 to 23 50 |
| Steel axles | 19 50 to 20 00 |
| Cast borings | 8 50 to 9 00 |
| Mixed borings, etc | 8 50 to 9 00 |
| Wrought turnings | 13 00 to 13 50 |
| Machine shop turnings | 13 00 to 13 50 |
| Iron axle turnings | 13 50 to 14 00 |
| Steel axle turnings | 13 00 to 13 50 |
| Stove plate and light cast scrap | 12 00 to 13 00 |
| Old iron splice bars | 20 50 to 21 00 |

## CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, May 6.

Although actual sales are probably no larger than they have been through the several dull weeks which have passed since the reduction in prices by Southern Association furnaces had such a depressing effect, there is now a more hopeful feeling entertained by nearly all classes of sellers. It is pointed out that the prosperity of the country continues with no indication of a change, that the demand for pig iron and steel throughout the year will be immense, and that, while buying may be on a somewhat lower basis, the time when orders must be placed more freely can not be indefinitely postponed. There is a strong feeling in many quarters that prices have been too high.

**Iron Ore.**—The shipments of ore from Lake Superior ports for April were 980,325 tons, as against 1,855,002 tons in April, 1902, a decrease of 874,677 tons. These figures are not surprising, as it was known that the delay in the opening of navigation, due principally to labor troubles, would make it impossible to ship much more than half as much as was shipped last year. The April shipments can not be taken as indicative of those of the season, but there is support for the view that the total for 1903 will not equal that of 1902. The railroad situation does not give promise of being better than last year, for the comparatively small number of vessels which have arrived at Lake Erie ports have been detained on an average of three days before being able to unload. Ore sales are being made slowly in small lots, but sales agents are hopeful that when the present period of dullness in foundry iron passes away there will be heavy buying of raw material. They affirm that there is not the slightest probability that prices will be lower.

**Pig Iron.**—"There is no market," is the way in which one prominent pig iron agent described the present condition and certain it is that there has not been, for a long time, such dullness in foundry iron. But men of many years' experience in the business are confident that, unless Southern furnacemen make further concessions, there will be a decided buying movement by the first of June. Keen interest is felt in the Southern situation and opinions vary as to what will be the next move of the furnacemen in that section. Prices have not changed since last week; in fact, transactions have been so few that it is difficult to cite any as determining quotations. We quote as follows, f. o. b. Cleveland:

| | |
|---|---|
| Bessemer | $21 00 to 21 50 |
| No. 1 Strong Foundry | 21 75 to 22 00 |
| No. 2 Strong Foundry | 21 00 to 21 50 |
| No. 3 Foundry | 20 25 to 20 75 |
| Scotch No. 1 | 22 00 to 22 25 |
| Scotch No. 2 | 21 25 to 21 75 |
| Gray Forge, Valley | 19 00 to 19 25 |
| Lake Superior charcoal | 24 00 to 25 00 |

**Finished Material.**—The market is quiet but firm with no indications that prices will be lower at any time in the near future. Agricultural interests are, as a rule, buying steel bars to suit early requirements only, having specified pretty fully on old contracts and not being inclined to make new season contracts. As long however, as billets are as high and scarce as at present, there is no probability that the price for steel bars, 1.60c for Bessemer and 1.70c for open-hearth, Pittsburg, will be lower. Independent mills whose rolling facilities are limited to ordinary sizes are quoting bar iron as low as 1.75c, Cleveland, but the larger producers rolling all sizes are selling at from 1.80c to 1.85c and are disposing of a fair tonnage. The demand for structural material, while considerably behind that of last year, is very fair and will probably be stronger unless building operations are checked by strikes. Agreement quotations are as follows: Beams and channels, 3 to 15 inches, 1.75c; 18 to 24 inches, 1.80c; tees, 1.75c; zees, 1.70c; angles from 3 to 6 inches, 1.70c; universal plates, 1.70c. Reports concerning sheets are somewhat conflicting. It is unquestionably true that specifications have been coming in rapidly on orders placed several months ago. Some dealers report large current sales of sheets while others say the demand is only moderate. On the whole, it may be said that the sheet situation is improved, but that it is not such as to justify higher prices. The independents may in rare cases have gotten premiums, but they are usually content with the prices of the principal producers. Cutting below those quotations is not often heard of nowadays. The announced prices of the principal producer for sales through jobbers are as follows: Galvanized sheets, mill sales, carload lots, Nos. 10 and 11, 2.60c; Nos. 12-14, 2.70c; Nos. 18 to 21, 3c; Nos. 22 to 24, 3.20c; Nos. 25 and 26, 3.55c; No. 27, 3.80c; No. 28, 4.05c; No. 29, 4.45c; No. 30, 4.95c. Galvanized sheets out of stock are quoted 75 and 5 off. For 3-16-inch black sheets and heavier we quote 2.15c, Cleveland. Mill sales of black sheets to consumers are made on the following basis: No. 24, 2.65c to 2.75c; No. 26, 2.75c to 2.85c; No. 27, 2.85c to 2.95c. The following are prices out of stock. No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60c; No. 14, 2.50c to 2.60c; No. 16, 2.60c to 2.70c; Nos. 18-20, 2.75c to 2.85c; Nos. 22-24, 2.85c to 2.95c; Nos. 25-26, 2.95c to 3.05c; No. 27, 3.05c to 3.15c; No. 28, 3.15c to 3.25c.

**Old Material.**—The market continues dull and the tone is weaker. Buyers whose contracts will expire shortly are not disposed to make renewals. Prices are to a considerable extent nominal, as conditions are unsettled, awaiting developments in pig iron and bar iron. We quote f. o. b. Cleveland, gross tons:

| | |
|---|---|
| Old iron rails | $26 00 to 27 00 |
| Old steel rail (over 6 feet) | 22 00 to 22 00 |
| Old steel rails (6 feet and under) | 20 50 to 21 00 |
| Old car wheels | 24 50 to 25 00 |
| No. 1 R. R. wrought scrap | 22 00 to 22 50 |
| Mill scrap | 19 00 to 19 50 |
| No. 1 machine cast scrap | 19 50 to 20 00 |
| Iron axles | 29 00 to 30 00 |
| Steel axles | 28 00 to 29 00 |
| Axle turnings | 17 00 to 18 00 |
| Wrought turnings (free from cast) | 16 00 to 17 00 |
| Cast borings | 10 00 to 10 50 |
| Uncut wrought iron boilers | 11 00 to 12 00 |
| Steel boiler plates | 18 00 to 19 00 |
| Grate bars | 13 00 to 14 00 |
| Pipes and flues (clean) | 17 50 to 18 50 |
| Tank iron | 17 00 to 18 00 |
| Hoop and band iron | 13 50 to 14 50 |
| Sheet iron | 12 00 to 13 00 |
| Wrought drillings | 15 50 to 16 50 |
| Malleable iron (railroad) | 19 00 to 20 00 |
| Malleable iron (agricultural) | 16 50 to 17 00 |
| Stove plate | 15 00 to 16 00 |
| Heavy steel | 21 00 to 21 50 |

## CINCINNATI.

May 5.

Coke continues easy but with a range of prices depending on quality. We hear of better than $4 per ton f. o. b. ovens on some inferior grades, but the better qualities of Connellsville are uniformly quotable at $4.50 to $5 f. o. b. ovens. These quotations represent prompt shipment coke. For extended deliveries prices are close to $5 f. o. b. ovens.

**Pig Iron.**—Prices have become very irregular on Southern irons and quotations are lower than last week. It is now clearly established that $16 Birmingham for No. 2 foundry has been done at several places throughout the territory. It is current talk that sales have been made at this price at Chicago, Dayton, Elyria, O., Newark, O., and Detroit, Mich. How large orders have been placed can not be ascertained, but from the talk of traveling men it would appear that buyers only took small quantities, as some of the disappointed ones were told by the buyers, in some cases, that they would have another chance soon to figure. While it is a buyers' market, consumers are so timid and so distrustful of the situation that they hesitate to buy at what might appear to be an attractive price. The market is not only weak but exceedingly dull. Every inquiry that looks at all promising develops a number of traveling men eager for orders.

This effort for business is made by the independent furnace representatives, as the association furnaces are rigorously maintaining their schedule in the face of a broken market made by the independent interests. The attitude of the buyer is now the most interesting phase of the situation. So far as can be learned, buyers have concluded to wait until some kind of a settled market shall develop before proceeding with any confidence. They would rather buy on a strong and advancing market than take the chance now of coming in at a price that might look high later on. To add to this feeling traveling men do not ad-

vise purchases at this time, if their opinion is called for. It is also now apparent that foundries are feeling the effect of the declining pig iron market, as orders for castings, which are placed on a basis scaling with pig iron prices, are being withheld. Large users of castings for electrical work and machinery have a good stock of castings on hand which were taken to warehouses in anticipation of possible labor troubles in the foundries on May 1. These features are not serious, but they tend to aggravate a dull and weak market. We revise quotations this week to a lower level on all grades, but the bulk of the business has not been done at inside prices. We quote for any delivery f. o. b. Cincinnati:

| | |
|---|---|
| Southern Foundry No. 1 | $19 75 to 20 25 |
| Southern Foundry No. 2 | 19 25 to 19 75 |
| Southern Foundry No. 3 | 18 75 to 19 25 |
| Southern Foundry No. 4 | 18 25 to 18 75 |
| Southern Foundry No. 1, soft | 19 75 to 20 25 |
| Southern Foundry No. 2, soft | 19 25 to 19 75 |
| Gray forge | 17 75 to 18 25 |
| Northern Foundry No. 1 | 22 15 to 22 65 |
| Northern Foundry No. 2 | 21 65 to 22 15 |
| Southern car wheel iron | 26 75 to 27 75 |

**Finished Material.**—The market holds steady with a fair demand. The easier condition of this pig iron market is causing buyers to talk lower prices to some extent, but current quotations are generally well maintained. Galvanized sheets are being quoted at 75 and 5 percent off. We quote black sheets No. 27 at 2.78c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 3.10c; No. 27, 3.20c; No. 16, 2.65c; No. 14, 2.55c; No. 12, 2.45c; No. 10, 2.35c. Tank plates are firm and sell out of store at 2.15c for ¼-inch and 2.25c for 3-16-inch. Beams and channels are quoted at 2.15c to 2.25c from stock, and angles at 2.15c to 2.25c for base sizes. In merchant pipe there is no change in prices and no noticeable change in business. It is just a good steady trade. We quote:

MERCHANT PIPE.
(Basing Discounts.)

| | Steel Pipe. Black. Percent. | Steel Pipe. Galv. Percent. | Guaranteed Wrought Iron Pipe. Black. Percent. | Guaranteed Wrought Iron Pipe. Galv. Percent. |
|---|---|---|---|---|
| ⅛, ¼, ⅜ inch | 66.7 | 56.7 | 63.7 | 53.7 |
| ½ inch | 68.7 | 58.7 | 65.7 | 55.7 |
| ¾ to 6 inch, inclusive | 73.7 | 63.7 | 70.7 | 60.7 |
| 7 to 12 inch, inclusive | 67.7 | 57.7 | 64.7 | 54.7 |

BOILER TUBES.

| | Steel Percent. | Iron Percent. |
|---|---|---|
| 1 to 1¼ inch | 41.2 | 35.2 |
| 1¾ to 2½ inch | 54.2 | 34.2 |
| 2¾ to 5 inch | 59.7 | 44.2 |
| 6 to 13 inch | 54.2 | 34.2 |

**Old Material.**—The market is easy in tone but there is no quotable change in prices. Dealers pay the following:

| | |
|---|---|
| Old No. 1 railroad wrought, net tons | $19 00 to 19 50 |
| Cast machine and foundry, net tons | 17 00 to 17 50 |
| Old iron rails, gross tons | 22 50 to 23 00 |
| Old steel rails, gross tons | 21 50 to 22 00 |
| Old short lengths, gross tons | 17 50 to 18 00 |
| Old iron axles, net tons | 27 00 to 27 50 |
| Old chilled car wheels, gross tons | 22 00 to 22 50 |
| Stove plate, net tons | 11 50 to 12 00 |
| Wrought turnings, net tons | 15 50 to 15 75 |
| Cast borings, net tons | 12 00 to 12 50 |

## NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST. May 6.

**Pig Iron.**—The pig iron situation in this vicinity still continues to be marked by stagnation, only broken by the appearance of buyers occasionally purchasing in small lots to meet current requirements. Trading of this character is more pronounced than for over a year, and predictions are made that it will continue to be so for several weeks. Makers are doing little or no business for the second half. Prices for domestic irons are irregular. Pennsylvania interests are reported to be selling at slight recessions, in their endeavor to dispose of the increased output of their furnaces. The sales are light, however. In foreign irons sales of foundry grades have practically ceased. Cables show a sagging tendency in warrants, and private mail advices speak as if still further declines are imminent. Some buyers of English irons have insisted on cancelling their orders; it is also a fact that some English iron has arrived at this port recently which the buyer has refused to take. From this standpoint the pig iron market is in a far more unsettled state than most advices would indicate. We quote New York prices for immediate delivery as follows: No. 1 X Northern, $21.50 to $21.75; No. 2 X Northern, $20.25 to $20.75; No. 2 plain Northern, $19.75 to $20.25; No. 1 Southern foundry, $21.50 to $21.75; No. 2 Southern foundry, $20.50 to $20.75; No. 3 Southern foundry, $19.50 to $19.75; No. 4 Southern foundry, $19 to $19.25.

**Billets.**—Inquiries for German billets are being made in large numbers, one Western concern being in the market for 10,000 tons of Bessemer basic billets. The sale is likely to be consummated in a few days. The price will be from $29 to $29.25, which forms the current quotation, although in Philadelphia better could be done because of lower ocean freights. June is named as the earliest time for delivery. There is little doing in open-hearth billets, which are quoted at $30 to $30.25.

**Finished Iron and Steel.**—The American Bridge Co. reports its April sales to have been the largest for any month this year, and believes that May will eclipse the business it did for the same month last year, when it had its best month, it aggregating 75,000 tons. Labor troubles still form a cloud over the structural material market, the strike of teamsters being the latest thing to hamper construction. Sales by the leading interest during the week were heavy in the aggregate, the most notable being 4,500 tons for the Pennsylvania Railroad for bridge work. Sheets are more active, and prices show a decidedly stiffening tendency, especially for spot stocks. No advances have been reported, and an energetic summer season is confidently expected. There are no developments of fresh interest in plates and bars. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.25c; sheared steel plates, tank, 2.10c to 2.15c; flange, 2.25c to 2.30c; fire box, 2.30c to 2.50c; refined iron bars, 1.95c to 2.10c; soft steel bars, 1.80c to 2c; steel sheets, in carloads, New York, No. 28 black, 3.05c to 3.15c; galvanized, 72½ to 75 and 2½ off.

## PHILADELPHIA.

May 5.

There are indications of lower prices in nearly all kinds of iron and steel. There is firmness in places, but the general trend is downward. A marked exception is basic iron. The most pronounced weakness is in foundry grades, but it is due to better transportation facilities and abundance of cheaper fuel rather than to shrinkage in consumption. Purchases of large lots of foreign material are reported.

**Pig Iron.**—Middlesboro has been quoted at from $17.50 to $18 for cargo lots and Scotch iron at relatively low prices. American pig iron, except basic, could be had for less than the most recent quotations, but bids are not offered and sellers say there is no use making lower quotations until buyers are ready to place orders. Deliveries on old contracts are heavy. Prices during the week have not made any quotable change. We quote as follows: No. 1 X foundry, $22.50 to $23; No. 2 X foundry, $21.25 to $21.50; No. 2 plain, $20.50 to $21; gray forge, $19 to $20; Middlesboro No. 3, $20.50 to $21; Scotch, $21.50 to $22.50; basic, $19.75 to $20.25.

**Steel.**—In spite of apparent scarcity, prices are lower. American basic open-hearth has been bought at $32 and foreign to the extent of 12,000 to 15,000 tons at about $29. Large sales are pending at still lower prices. German markers are active and determined to sell.

**Finished Material.**—The market is neither strong nor active. The increased capacity is capable of meeting an immense demand and there is sharp competition. Labor troubles are causing some uneasiness and tending to check demand. The usual monthly meeting of the Bar Iron Manufacturers' Association was held in New York on May 1, but no action was taken in regard to prices, although the situation was regarded as less favorable than

for some time past. Prices are nominally unchanged as follows: Plates in small lots, 2c to 2.05c; carload lots, ¼-inch and thicker, 1.85c to 1.90c; universals, 1.90c; flange, 2.10c; marine, 2.15c to 2.20c; firebox, 2.25c to 2.30c. Best refined bar iron, 1.93½c for carload lots as a minimum quantity and 1.75c to 1.85c for steel bars. For beams, angles or channels, ordinary sizes, 1.73½c to 1.78½c is the range for carload lots, with the usual addition for smaller quantities.

**Old Material.**—The market is dull and prices are tending to a lower basis. We quote: Old steel rails, $21.50 to $22; miscellaneous heavy steel scrap, $20.75 to $21.50; low phosphorus scrap, $28 to $29; old steel axles, $26 to $27; old iron axles, $29 to $30.50; old iron rails, $24.50 to $25.50; old car wheels, $23.50 to $24.50; choice scrap R. R. No. 1 wrought, $23 to $24; country scrap, $20 to $21; machinery cast, $19 to $20; No. 2 light scrap (forge), $18.50 to $19; No. 2 light scrap (ordinary), $14 to $15; wrought turnings, $16 to $17; wrought turnings, choice heavy, $18 to $18.50; cast borings, $11.25 to $11.75; stove plate, $15.50 to $16.50.

## BIRMINGHAM, ALA.

May 5.

Association prices are being adhered to by interested parties here, but it is generally admitted that the independent companies are cutting prices, and in the Central West it is understood they are making the same prices as named by the others in the East, namely, $16.50, Birmingham, for No. 2 foundry. However, at any prices that may be made, it is known that only a limited tonnage has thus far been booked for the last half, and a number of sellers intimate they would prefer not to sell at any time further than three months ahead, basing this preference largely on their experiences the past twelve months. Up to this time there has been practically no accumulation of stocks in the yards of the furnaces, and it is not expected there will be before Aug. 1, by which time buyers will have placed orders somewhere.

Supplies of raw material are ample. Coke is still scarce and commands $5 at the ovens; but all furnaces seem to keep sufficient stock to supply their daily needs. Transportation facilities are better than for eight months.

The Louisville & Nashville Railroad Co. is now arranging to carry out its plan of removing its yards and shops to Boyles, about five miles north of the city. This will greatly relieve congested conditions heretofore prevailing, because of insufficient room in the yards as now located in the city limits. It is proposed to expend about $300,000 in establishment of the new shops, yard room, etc. In connection with this announcement, and the consequent demand for real estate in that section, there has sprung up a report that the United States Steel Corporation has secured options on a large tract of land near Boyles for the erection of several furnaces, a large steel plant, etc., having already optioned sufficient coal lands in the immediate vicinity and ore property in different sections of the State. Diligent inquiry fails to confirm any of these reports and it is not believed here that the steel trust is seriously considering any such project.

There continues great activity in building in Birmingham proper. Two ten-story office buildings have been completed within the past six months, and the First National Bank Bldg. is being rapidly pushed along. This will be 140x100 feet, 10 stories, and the costliest structure ever erected in Birmingham. The Moore & Handley Hardware Co. is building a five story building, which will be occupied by them as a wholesale and retail hardware house. It is said that this will be the largest and most complete establishment of its kind in the South.

Mineral lands continue to attract attention of investors and transactions are constantly occurring, principal interest centering on ore properties. New coal and ore mines are being opened, and there is great demand for labor of all kinds.

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Samuel Marsland & Son, Manchester, England, large manufacturers of variety iron work, are buying all of their cold pressed nuts at Port Chester, N. Y., because they can get a better quality of goods at more favorable prices than in England. The superiority of the American made materials of this kind has often been demonstrated and new contracts are being placed almost daily in different parts of Great Britain.

# The Metal Market.

## NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., May 5.

**Pig Tin.**—Up to yesterday the pig tin market was quiet and firm, but today prices sagged off, making closing quotations the lowest for the week. Current trading continues light. The London market for the week has been fairly active, with prices today representing at least £1 decline since our last report. Spot and futures are now selling on an equality. Statistics for April show America's visible supply to be 8,659 tons, and the world's visible supply to be 15,978 tons, against 15,596 tons for the same period last year. Arrivals at Atlantic ports for the month to date amount to 56 tons, with 4,884 tons afloat. Today's closings at the Metal Exchange were as follows: Spot to June, 29.90c to 30⅛c. London closed at £136 for both spot and futures.

**Copper.**—An extremely limited market has been the history of the week, and prices are nominal. The buying is of the narrowest kind, with both large and small consumers delaying purchases in anticipation of lower prices. In London during the week, the metal rose on bullish manipulation, and prices at this writing are up over £1 since our last quotations. Statistics show the exports for the past four months to have been 45,734 tons, against 65,890 tons for a corresponding period last year. Bearish interests are making considerable capital out of the figures. Closing prices at the Metal Exchange were as follows: Lake and electrolytic, 14¾c to 15c; casting, 14½ to 14¾c. London closed today as follows: Spot, £61 2s 6d; futures, £61.

**Lead.**—Is dull. Lots of 50 tons or more are selling at 4.37½c. St. Louis is 4.25c; and London £12 1s 3d.

**Spelter.**—Continues strong at 5.75c for spot. St. Louis unchanged at 5.50c. London slightly higher at £21 15s.

**Antimony.**—Cookson's is easy at 7¾c to 8c. Hallett's is unchanged at 7c. Other brands are 6¾c.

**Quicksilver.**—Slightly higher at $47.50 per flask of 76½ pounds in lots of 100 flasks. London unchanged at £8 2s 6d.

**Nickel.**—In good request at 40c to 47c for large lots down to a ton, and 50c to 60c for smaller quantities.

## CHICAGO.

OFFICE OF *The Iron Trade Review*,
519 MONADNOCK BLOCK, May 5.

Demand has fallen off to some extent during the week under review, the market being affected by the unsettled labor situation. All metals are quiet, and while prices are without material change, they are weaker. We quote lake copper, carload lots, Chicago delivery, 14¾c; smaller quantities, 15c. Pig tin, 31c; pig lead, 4.30c in 50 to 100-ton lots, and 4.32½c in lesser quantities; spelter, 5½c in carload lots, and 5¾c to 6c in lesser quantities; sheet zinc, 6¾c; antimony, 10¾c to 11c for Cookson's, and 9¾c for Hallett's. We quote old metals as follows: Copper wire, 12¼c; heavy copper, 12c; light copper, 11½c; heavy red brass, 12c; heavy yellow brass, 9c; light brass, 8c.

### Jones & Laughlin Steel Co. Improvements.

The Jones & Laughlin Steel Co., Pittsburg, has nearly completed plans for part of the improvements announced some time ago. The first of the two additional blast furnaces proposed will be of about 450 tons daily capacity, being not as high as the other Eliza furnaces, and being designed particularly to use Mesabi ore. This furnace will be known as Eliza No. 5 and may be followed later by No. 6. The additional Talbot furnaces will be erected in pairs, four altogether being contemplated for the near future, with an output of about 200 tons daily per furnace. Plans for the first two are nearly finished. The first Talbot furnace, which has been in operation since late last summer, is making about 200 tons daily. The company has had its new blooming mill in operation for two or three weeks, and the mill is doing well for a beginning. No. 11 mill, on which small beams and channels, as well as angles from 4x4 up to 6x6 inches, are rolled, is to be removed to a location giving more room, on ground recently purchased, and the mill will be considerably enlarged, the capacity being increased about one half. Two engines will be used to run it instead of one.

## PERSONAL.

Ysbrand B. Haagsma, secretary and auditor of the Republic Iron & Steel Co., Chicago, has resigned to become president of the United States Trust & Savings Bank, which is being organized in that city. Mr. Haagsma is succeeded as auditor of the company by H. L. Rownd, formerly assistant treasurer. A secretary will not be appointed until the next meeting of the board of directors.

M. L. Jenkins, for many years superintendent of the machine shops of the Fairbanks-Morse plant, at Beloit, Wis., has been appointed superintendent of the Allis-Chalmers plant, West Allis, Wis. Mr. Jenkins succeeds Frank Davis, who recently resigned to accept a position with the Westinghouse Electric & Mfg. Co.

William Burleigh has been chosen general manager of the Novelty Iron Works, Sterling, Ill., to succeed Frederick F. Mason, who died recently. Mr. Burleigh has been Mr. Mason's assistant.

C. P. Wheeler, of Pickands, Brown & Co., Chicago, has returned from his trip abroad. Mr. Wheeler spent three weeks in Egypt, six weeks in Italy and two weeks in Paris.

Clyde M. Carr, secretary of Joseph T. Ryerson & Son, Chicago, who went abroad early in January, has returned.

John J. Cone and James C. Hallsted, of Robert W. Hunt Co., sailed for Europe in the Campania, on May 2, the former returning abroad after a few weeks' visit home. Mr. Hallsted has gone over to give his personal supervision to the inspection of the structural material for two large London hotels, which has been awarded to his firm. These contracts, together with several others for buildings to be erected in England and South Africa, as well as the bridge material for this continent, have compelled the firm to organize a foreign structural and bridge department, in addition to the one in charge of rails, splice bars, billets, etc.

George L. Reis, for the last eight years general superintendent of the Bayview plant of the Illinois Steel Co., assumed charge May 5 of the works of the Illinois Steel Co. in South Chicago, succeeding C. J. McCullough, Jr. Mr. Reis' appointment went into effect May 1.

## The Hanging Rock Region.

IRONTON, O., May 4.—The Crown Casting Co., of Jackson, O., will build an addition to their foundry. It will be of brick, 90x120 feet.

The Belfont Iron Works Co., of Ironton, has purchased a large blowing engine at Stribler, Tenn., and will ship it here for the Belfont furnace.

The wire and wire nail departments of the Kelly Nail & Iron Co. mills went on last week, working up stock on hand. The strike situation at Ashland, Ky., remains unchanged, precluding the possibility of any steady run at the local nail mills.

The Harbison-Walker fire brick plants at Fire Brick, Ky., are almost completely tied up on account of a strike among the men, but a portion of the plant is being operated. Last week the management had fifteen of the strikers arrested for intimidating one of the workmen. The men promised to leave town and the case was dropped.

Jefferson Furnace, the only charcoal furnace in Jackson County, will go into blast about May 15. The furnace was built in 1854 and has been idle for years.

L. F. Barnes, formerly superintendent for the Wellston plant of the Lehigh Portland Cement Co., is back of a movement to start a large cement mill at Oak Hill, Jackson county.

The Peck-Williamson Co. has just completed a large new mounting room, 210 feet long, at its Wellston foundry.

Bound in a sea-green cover, and with its illustrations printed in ink of the same color, the recently published catalogue of the Great Lakes Engineering Works, of Detroit, is in a dress suggestive of its appropriate element. Frontispiece views show in one the pattern shops, forge shops, foundries and machine shops of the company, and in another the shipbuilding plant on the Detroit River, with its building berths and floating steel dry dock. Excellent half-tone illustrations are given of the marine engines, hydraulic dredging machinery, air compressors, centrifugal pumps, propeller wheels, forgings, etc., built at these works, and there is a list of lake steamers whose equipment was built and installed by the company, with plates of some of the more notable vessels. The berths at the new ship yards are 800 feet long, permitting of the building of two boats at the same time on each berth.

## Chicago Machinists' Demands.

(Special Telegram.)

CHICAGO, May 6.—Conference committees representing the machinists and the Metal Trades Association, are in session this afternoon and the probabilities are that a settlement involving concessions to both sides will be reached.

## Supplement to the Iron and Steel Directory.

We have received a copy of the Supplement to the Directory to the Iron and Steel Works of the United States, an advance notice of which has already appeared in these columns, and it fully bears out all the promises made for it. In addition to the classified lists of leading consumers of iron and steel, including car, car wheel and locomotive works, pipe works, wire and wire nail works, bolt and nut works, chain works, forges, malleable and steel foundries, etc., the supplement gives a full account of the following consolidations: American Steel Foundries, American Steel Casting Co., American Bridge Co., American Bridge Co. of New York, Empire Bridge Co., American Car & Foundry Co., Pressed Steel Car Co., Southern Car & Foundry Co., Railway Steel Spring Co., Standard Chain Co., American Locomotive Co., National Tube Co., Shelby Steel Tube Co., Central Foundry Co., United States Cast Iron Pipe & Foundry Co., American Ship Building Co., United States Shipbuilding Co., National Enameling & Stamping Co., American Steel & Wire Co. of New Jersey, and the National Steel & Wire Co. No new edition of the Directory will be published in 1903, and the Supplement supplies valuable information not available elsewhere. The price of the book is $5.

## Mr. Carnegie's Offer for an Engineers' Building.

The boards of directors of the engineering societies interested in the proffered gift of $1,000,000 from Andrew Carnegie, will meet and discuss the proposition for a union building at the house of the American Society of Civil Engineers tonight, May 7. Mr. Carnegie's project was broached some time ago, but the matter has been kept quiet until options could be secured on five contiguous properties on the north side of 39th St. and west of Fifth Ave., New York. These lots are immediately in the rear of property recently purchased on the south side of 40th St., 50x100 feet, and about 420 feet west of Fifth Ave., this purchase having been made to provide a site for a new club house for the Engineers' Club.

M. A. Bradley, Capt. M. Mulholland and other Cleveland men closed a contract May 5 with the Columbia Iron Works, Port Huron, Mich., for the largest steamer on fresh water. It will be a freighter and will be ready for service at the opening of navigation next year. The dimensions are: Length over all, 500 feet; keel, 480 feet; beam, 52 feet; depth of hold, 30 feet, with a 6-foot water bottom. She will be built on the 3-foot frame space system and will have fifteen hatches each 9 feet long. Power will be furnished by triple expansion engines and three Scotch boilers.

The Lackawanna Steel Co. is considering the advisability of using power from Niagara Falls to operate machinery at its plant in West Seneca, near Buffalo.

In the construction of the new Stock Exchange Building in New York City, which was formally opened a few days ago, 300,000 tons of steel and 850 tons of iron was used and the weight of the elevator plant is 337 tons additional.

Furnace No. 2, at Duquesne, Pa., was blown in on May 5, after relining and improvements.

# THE IRON TRADE REVIEW

**Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.**

PUBLISHED EVERY THURSDAY BY

THE IRON & STEEL PRESS CO.,

ROSE BUILDING, CLEVELAND, OHIO.

G. H. GARDNER, President and Treasurer,
JOHN A. PENTON, Vice President,
A. I. FINDLEY, Secretary.

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CHICAGO: 519 Monadnock Block, GEO. H. GRIFFITHS, Manager.
PITTSBURG: 429 Park Building, A. O. BACKERT, Manager.
NEW YORK: 150 Nassau St., D. C. WARREN, Manager.
THE CENTRAL WEST: R. A. EVANS, Manager.

**Subscription, $3.00 per annum. To Foreign Countries, $4.00.**
**Advertising Rates Furnished on Application.**

The Cleveland News Co. will supply the trade with THE IRON TRADE REVIEW through the regular channels of the American News Co.

ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER.

MAY 7, 1903


## THE NUB OF THE EXPORT QUESTION.

British trade journals, which three years ago discussed almost weekly and in a tone of alarm the probable consequences of American competition in iron and steel, now aver that it will not be much of a shower. One ground of their later opinion appears to be that a country which is so variable in trade aspects as to import nearly a million tons of foreign iron and steel in a twelvemonth, and that only three or four years after having made a record of about a million and a quarter tons of iron and steel exports, much of it to the very countries from which it has lately been exporting, need not be regarded as a permanent menace.

But one is surprised to read that the excessive capitalization of the United States Steel Corporation and the valuation of $700,000,000, or $1 a ton in the ground, put by its officers upon its ore reserves is seriously considered by our British friends as one of their chief safeguards against American competition in iron and steel. All that may be said upon paper or in the councils of manufacturing and engineering societies about theoretical costs of manufacture in the United States or valuations on minerals or plants has little or nothing to do with the case. The cost of millions of tons of Lake Superior ores taken up seven and eight years ago by interests later made a part of the United States Steel Corporation, has not changed a particle since the day they were acquired. Ores from these same properties entered into steel that was shipped into Great Britain in uncomfortable quantities in 1897 and 1898. The question is not what is being paid for Lake Superior mines by those who go after their own ore supply today, nor how much water is in the steel corporation's stock, nor what valuation it puts upon its ore in the ground, but what tonnage will be required in time of slackened home demand to keep its mills running at a rate affording the greatest economy in production? Tonnage is the key to the export problem. What the German syndicates are doing today in making prices that give them increasing access to British iron and steel markets, is a good suggestion of the course that will be taken by producers in the United States when need requires them to get more business than can be found at home. Germany's home prices are no barrier to exports to Great Britain; neither will the prices, whether of raw or finished material, that may prevail in the United States be any true index of the basis on which American steel will go into British markets when the time comes. It is the relatively small American surplus that the British manufacturer of steel has to fear. That surplus will neither make nor mar the dividend chances of United States Steel Corporation stocks. It will be moved from this country on the lines of least resistance; and that means that the country without tariff barriers, with high freight charges and unprogressive railroad policy, with manufacturing equipment that should be scrapped and with corporation directories whose incessant demand is for dividends, while money for improvements is doled out with grudging hand—this will be the country in which a large proportion of the surplus will find its destination.

## INCREASE OF IRON AND STEEL IMPORTS.

The report of the Treasury Department for March shows that the imports of pig iron were 59,628 tons, which is 14,441 tons more than for February. This is rather disappointing, as when the report for February showed such a rapid decrease in imports, it was commonly believed that they would not soon increase. Prominent dealers in pig iron declare, however, that recent imports have been almost entirely on old contracts, and this statement is in harmony with the following comment on the iron market in a recent issue of the London *Economist*:

"As to demand from the States, there is no question as to its being off. It may come again—time will prove—but at present, and for more than a month back, the orders have been few and far between, and the lots bought small, not to say insignificant. On old contracts, a fair quantity of iron has yet to go. This month, however, will probably see the bookings pretty well exhausted, so that for what will follow there is not long to wait."

The imports of steel for March show a large increase, being 31,464 tons, or 11,313 more than for February. The imports of iron and steel for the first quarters of 1902 and 1903 were as follows:

| | 1902. | | 1903. | |
|---|---|---|---|---|
| | Pig Iron. | Steel. | Pig Iron. | Steel. |
| January | 7,633 | 5,312 | 110,679 | 38,691 |
| February | 8,307 | 2,235 | 45,187 | 20,151 |
| March | 17,184 | 6,570 | 59,628 | 31,464 |
| | 33,124 | 14,117 | 215,494 | 90,306 |

The following table gives the imports for March and for the nine months ending with March:

IMPORTS OF IRON AND STEEL TO THE UNITED STATES—GROSS TONS.

| | March. | | 9 mos. end'g March. | |
|---|---|---|---|---|
| | 1902. | 1903. | 1902. | 1903. |
| Pig iron | 17,184 | 59,628 | 76,728 | 725,270 |
| Scrap | 1,855 | 7,327 | 19,131 | 97,944 |
| Bar iron | 1,597 | 3,986 | 18,853 | 34,445 |
| Iron and steel rails | 1,172 | 17,880 | 3,262 | 92,889 |
| Hoop, band or scroll | 17 | 219 | 3,557 | 1,291 |
| Steel ingots, slabs, billets or bars | 6,570 | 31,464 | 18,460 | 293,569 |
| Sheets and plates | 618 | 320 | 6,465 | 5,828 |
| Tin and terne plates | 5,618 | 3,477 | 71,204 | 37,391 |
| Wire rods | 775 | 1,778 | 11,353 | 17,476 |
| Wire and wire articles | 357 | 450 | 3,190 | 2,489 |
| Total | 35,763 | 126,529 | 232,203 | 1,307,582 |

The total value of iron and steel imports for March, not including ore, but including some manufactures of iron and steel not given in the above table, is $4,133,319 against $2,173,138 in March, 1902. For the nine months, the totals are: 1903, $38,691,373; 1902, $17,901,072. Iron ore imports have not yet been increased by the ad-

vance in prices of Lake Superior ores, for the imports for March were only 55,900 tons against 82,123 in March, 1902, and 64,378 tons in February, 1903. For the nine months, the imports of ore were: 1903, 771,728 tons; 1902, 827,487 tons.

Exports show a small increase, being 26,624 tons for March on articles named in the table as compared with 21,726 tons in February. For the month, the value of exports, not including ore, but including manufactured articles not named in the table, was $7,983,547 in 1903 and $8,362,307 in 1902; for the nine months, the values were: 1902, $73,067,830; 1903, $70,905,720. The following table gives the exports for the articles named:

EXPORTS OF IRON AND STEEL FROM THE UNITED STATES—GROSS TONS.

| | March. | | 9 mos. end'g Mar. | |
|---|---|---|---|---|
| | 1902. | 1903. | 1902. | 1903. |
| Pig iron | 1,716 | 1,532 | 49,370 | 14,580 |
| Scrap | 907 | 659 | 10 693 | 4,779 |
| Bar iron | 809 | 3,299 | 7,303 | 9,957 |
| Wire rods | 1,030 | 2,748 | 6,559 | 22,138 |
| Steel bars (not wire rods) | 984 | 913 | 13,909 | 10,728 |
| Iron rails | 5 | 7 | 605 | 54 |
| Steel rails | 8,038 | 415 | 146,777 | 20,184 |
| Billets, ingots and blooms | 93 | 157 | 2,430 | 1,986 |
| Hoop, band and scroll iron | 59 | 284 | 1,217 | 1,059 |
| Iron sheets and plates | 310 | 118 | 3,409 | 2,010 |
| Steel sheets and plates | 790 | 1,438 | 6,534 | 9,680 |
| Tin plates, terne plates and taggers' tin | 197 | 20 | 593 | 670 |
| Structural material | 11,695 | 1,939 | 51,071 | 24,744 |
| Wire | 6,766 | 10,158 | 69,184 | 70,167 |
| Cut nails | 458 | 554 | 4,528 | 5,009 |
| Wire nails | 1,849 | 2,236 | 13,478 | 19,993 |
| Other nails, including tacks | 129 | 147 | 1,426 | 1,803 |
| Total | 35,833 | 26,624 | 389,086 | 219,243 |

## A BUILDING FOR THE ENGINEERING SOCIETIES.

Current report credits the steel master rector of St. Andrews with an offer of $1,000,000 for an engineering home for the national technical societies, and newspaper comment hints also at a possibility of losing the proposed gift through a lack of harmony among the representatives of these organizations. Whether these fears are at all justified will not be known until a statement of the conditions accompanying the offer has been given to the public. It would be well to know what demands, if any, Mr. Carnegie's proffer makes upon the sustaining energies of the recipients.

Representatives of the Engineers' Club, the American Society of Mechanical Engineers, the American Society of Civil Engineers, the American Society of Electrical Engineers and the American Institute of Mining Engineers meet tonight at New York to discuss the proposition. A union house, of which many of the members have spoken hopefully when matters were not by any means so promising as at present, is in prospect. It would be more than a misfortune to miss the opportunity now presented by an eminent member of several engineering bodies, and the president of the Iron and Steel Institute, a man whose courage and insight as a captain of industry have left a permanent impress upon American life. Many a member of prominence in one engineering society has found a high place in another. For such the one engineering home will have manifest attractions. But the rank and file will also be benefited. The meager quarters which so inadequately serve their purpose at a general convention are no more than the machine tools of the past. They should give way to the more efficient equipment of a well located building with club conveniences, convention capacity, the privacy of individual headquarters for society machinery, as well as ample room for the "getting together" of congenial spirits.

A building of this kind in the metropolis of the country, designed, built and equipped by committees chosen by engineering societies of national scope, would add vastly to their united influence. The structure not less than the activities there centering would give dignity and strength to engineering, and be a constant inspiration to all who in any degree emulate the skill of those who adorn the honor rolls of the societies.

## WAGES IN CHICAGO FOUNDRIES AND METAL TRADES.

CHICAGO, May 5.—At the meeting of the foundrymen of this city and vicinity, who are forming an organization to be known as the Cook County Founders' Association, held at 906 Chamber of Commerce building, last Wednesday afternoon, a report was received from the conference committee appointed at a previous meeting, to meet with representatives of the local Iron Molders' Unions and discuss a settlement of the demands made by the latter. Both sides had agreed to a temporary arrangement, which is embodied in the following bulletin sent to all the foundrymen of Cook county by the association:

"BULLETIN NO. 1.

"Chicago, April 30th, 1903.

*"To the Foundrymen of Cook County:*

"DEAR SIRS: Resolved and recommended, that beginning tomorrow, May 1, 1903, and not later than Monday, the 4th day of May, 1903, all foundries in Chicago and Cook county at large shall start and run on the nine-hours-a-day basis, excepting those whose molders would prefer to work a longer time. Starting time not be earlier than 7 o'clock a. m., and not later than 8 o'clock a. m., according to the requirements of the respective establishments, at the present scale of wages, to wit: $3 per day minimum for molders, and $2.75 minimum for core makers for a nine-hour day's work. With this understanding, we adjourn and make this resolution subject to call at a time to be arranged between James Brown, business agent of the union, and A. Vanderkloot, to make this resolution permanent within about two weeks.

"(Signed) A. VANDERKLOOT,
"Chairman Conference Committee Cook County Founders."

The meeting referred to has been called for Thursday, May 7. The organization committee also reported with recommendations for permanent organization which were adopted, and a constitution and by-laws. The latter were amended in several instances and were referred back to the committee, action to be taken at the next meeting.

The Chicago Metal Trades Association, through committees appointed by the board of directors, has met during the week with committees representing the machinists, metal workers, blacksmiths' helpers, brass molders and workers for the discussion and settlement of their respective demands. In all cases a temporary working arrangement has been adopted, but it is probable that in the case of the machinists and metal workers, an arbitration committee will have to be called in for the adjustment of the claims of the union, neither side so far having shown any willingness to accept the counter propositions of either party.

The agreement made in March between the Chicago Brass Manufacturers' Association and the local brass workers' unions, which was printed in full in *The Iron Trade Review* of March 26, does not apply to those concerns which are members of the Chicago Metal Trades Association, and the latter have been presented with similar demands by the brass workers in their employ.

Armature winders, machine repair men and their helpers of Local Union No. 279, and the arc lamp repairmen of Local No. 29, of the International Brotherhood of Electrical Workers, have made demands on their employers for the nine-hour day and increased pay. Those firms that are members of the Chicago Metal Trades Association have referred these claims to that body for adjustment. First-class armature winders and machine repair men ask for 39 cents an hour; second-class armature winders and machine repair men, 28 cents an hour; helpers 20 cents an hour. The men's proposal provides that they shall take no sympathetic action on any labor dispute until after the grievance in question has been submitted to arbitration.

## FIFTY-FIVE HOURS IN CINCINNATI MACHINE SHOPS.

The Cincinnati Metal Trades Association, which embraces fifty of the largest machine shops and machinery manufacturers in Cincinnati and vicinity, employing over 6,000 men, voluntarily reduced the working hours in the shops from 57 to 55 hours per week. The shops are generally adopting the new rule in this first week in May. The workmen will receive the same compensation for 55 hours' work as for 57 hours. This action was agreed upon at a meeting on April 25. At close of the meeting the following prepared statement was given out:

"At a meeting of the Cincinnati Metal Trades Association held Saturday night it was unanimously resolved that the following notice be posted in the shops of the members on Monday morning next:

"The Cincinnati Metal Trades Association pledges their employes at all times that wages and hours of employment shall be consistent with industrial conditions.

"Beginning with the first week in May, 1903, the shops of this association will work 55 hours per week without reduction in weekly wages.

"For several weeks the executive committee has had under favorable consideration a reduction in hours without a reduction in pay. The recommendation of the executive committee to reduce the working hours to 55 hours per week, with no reduction in the weekly wage, was unanimously indorsed by the association. There is a good feeling existing between the employers of this association and their employes, and this voluntary action of the employers will tend to strengthen the existing cordial relations. Cincinnati leads all other cities in the manufacture of machinery, which is not only due to the progressiveness of the manufacturers, but also to the superior skill and intelligence of the Cincinnati mechanics."

This action was taken through no fear of trouble, as in Cincinnati the machinists' union has little control of the labor situation. The men appear to be pleased over the action and several of the manufacturers have received formal expressions of thanks from their workmen.

### Deering Harvester Works' Strike.

The strike at the plant of the Deering Harvester Works, Chicago, is still in progress. Reports from the union side are that with the exception of about 100 the entire force of over 5,000 employes had been unionized. The executive board of the Chicago Federation of Labor has assumed control of the situation, and efforts are being made by it to effect a settlement with officials of the company. The company has refused to consider the clause providing for recognition of the union, because it carried with it a provision for union shop stewards and union committees to pass upon the justice of discharges. To tolerate such methods means, in the judgment of the company, that the unions would run the business. The attempt to bring out the employes of the McCormick Division of the International Harvester Co. in a sympathetic strike failed, few of the several thousand operatives joining the strikers. Last week this company gave its employes holidays on Friday and Saturday with pay in order to consider the situation and decide whether they wished to continue at work or join the strikers, and practically the entire force decided to remain at work.

### Pittsburg Foundrymen's Association.

The Pittsburg Foundrymen's Association gave a smoker for its members and friends Monday night at the hall of the German Beneficial Union. Over a hundred foundrymen were in attendance, and well enjoyed the impromptu speeches and entertainment of various kinds provided by the program committee. Jos. S. Seaman acted as toastmaster. The object of the smoker was to bring the foundrymen of the Pittsburg district closer together, and particularly to interest men in the trade not now members of the association.

Dr. Richard Moldenke, of New York, secretary of the American Foundrymen's Association, formerly closely identified with the Pittsburg association, was present, and made an address urging the foundrymen to attend the national convention of the American Foundrymen's Association at Milwaukee, June 9, 10 and 11. He stated that the New England foundrymen had arranged to charter a number of Pullman cars, go to the convention in a body, and live in the cars while there, afterwards taking an extended tour through the country, stopping at points of interest.

A resolution of regret and sympathy was unanimously passed for the chairman of the program committee, A. O. Backert, who, while arranging nearly all the details of the smoker, was prevented by an attack of typhoid fever from being present himself.

### American Foundrymen's Association.

The local committee has chosen Hotel Pfister as headquarters for the American Foundrymen's Association convention at Milwaukee, Tuesday, Wednesday and Thursday, June 9, 10 and 11. Indications are that the programs for the general association and for the metallurgical and the foundry foremen's sections will be of unusual interest and that a large attendance will be attracted to the meeting. The New England foundrymen, whose entertainment of the Boston convention was so signally successful last year, expect to go by special train.

### President Schwab Re-Elected.

At a meeting of the board of directors of the United States Steel Corporation, held in New York, May 5, Chas. M. Schwab was re-elected president. All the other outgoing officers were re-elected. United States Senator John F. Dryden, of New Jersey, was elected a director in place of the late Abram S. Hewitt. No other business of importance was transacted. Mr. Dryden is president of the Prudential Life Insurance Co.

The product of the Pioneer furnaces of the Republic Iron & Steel Co., at Thomas, Ala., formerly sold through M. A. Hanna & Co., is now being marketed through the various sales offices of the Republic Iron & Steel Co.

Allis-Chalmers Co., Chicago, announces that on May 1 the general offices of the company were located in the New York Life building, 14th floor, corner of La Salle and Monroe Sts.

Representatives of the National Roofing Co., a consolidation under a working agreement of nearly all of the corporations in the United States that manufacture metal ceilings and roofing, met in Wheeling a few days ago to consider means of increasing the capacity of the corporations in the consolidation. The business of the companies is said to have increased very rapidly in the last twelve months.

Several tests have recently been made of steel manufactured by the Norwalk Steel & Iron Co., Norwalk, O. A severe test was made at the Wheeling & Lake Erie Railroad shops at Norwalk. A tool made from the Norwalk company's steel was placed in the lathe to turn down the steel tires of locomotive drive wheels, and the test was highly gratifying.

A party of Carnegie Steel Co. officials, including W. E. Corey, president, H. J. Lindsay, assistant, Thos. Morrison, superintendent at Edgar Thomson, A. C. Dinkey, superintendent at Homestead, and others, inspected the Sharon, South Sharon and New Castle plants of the company on Tuesday, May 5, and also visited Sharpsville, seeing there the Shenango Furnace Co.'s furnaces. They visit Youngstown May 6, Mingo Junction and Bellaire, Thursday, and Columbus Friday.

The Norwalk Steel & Iron Co., Norwalk, O., has contracted with the Logan Natural Gas & Fuel Co., to supply the plant with gas to take the place of coal, which is now being used. Considerable difficulty has been experienced in getting a satisfactory supply of coal.

William Geuder, president Geuder & Paeschke Mfg. Co., Milwaukee, metal stamping manufacturers, died suddenly at his residence last week.

## NEW SPEED CHANGING DEVICE.

The William E. Gang Co., of Cincinnati, has a new speed varying device which has been applied to one of its radials and has been running constantly in shop use for the last four months with entire satisfaction. The device will be applied to this company's line of radial drills, as illustrated by Fig. 1, which shows the recent design of radial drill with the speed

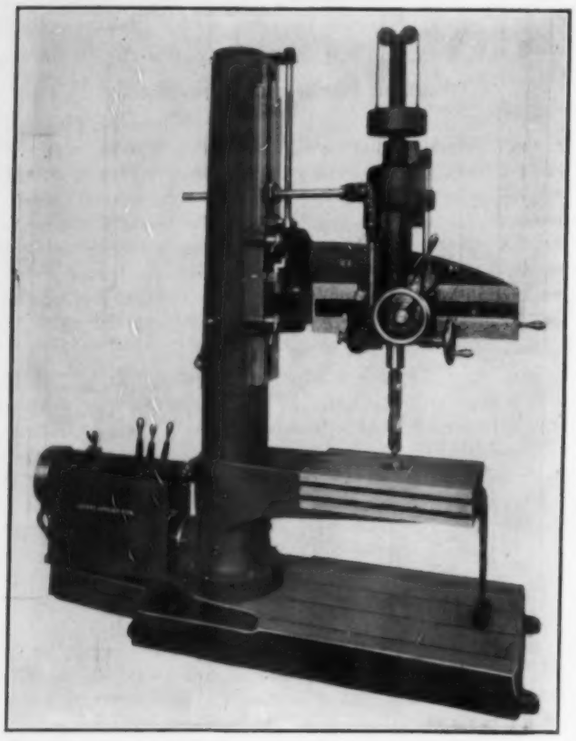

FIG. 1.—RADIAL DRILL EQUIPPED WITH SPEED BOX.

varying device attached. The idea in view of the designer was to afford a means of getting a greater number of speeds than is usually obtainable by cone pulleys and incidentally a system of facilitating the changing of speeds. Of course this purpose is accomplished more or less successfully by a number of other machines. There is a special feature, however, in the present design, and that is the ability it affords the workman to read and control the speeds directly from one point without having to operate a number of levers at different parts of the machine in connection with an index plate.

Fig. 1 shows the speed box applied to the radial drill, the spindle of the drill having a range of speeds from 25 to 400 revolutions per minute with 18 changes. Fig. 2 is a view of the speed box with the cover removed. As will be noticed there are three gearing sets of three gears each, a total of nine gears giving eight speeds, and this number can be doubled by the back gears on the spindle of the radial drill. The gears A B C are mounted loosely on the shaft S, and gears D E and F are mounted loosely on the shaft S. Shafts S and S' are journaled at the ends and are free to slide through the gears and journals. The intermediate gears X Y and Z are together fastened on a shaft and mesh respectively with A D, B E and C F. This gives three gear trains thus: AXD, BYE and CZF.

The shafts S and S' carry friction rings O and O' which engage in the bores of gears ABC and DEF and are operated by means of the sliding wedge W W' and loose collars G G'. The pulley P has a long hub which is journaled in the frame H and the bracket I, and is keyed to the shaft S. The dogs Q and Q' act as fulcrums for the levers L and L' and are loosely mounted between collars on shafts S and S' and have projections which engage in the grooves in the drum R.

The drum R has one annular groove turned near the end connecting with six long and six short longitudinal grooves. The splined shaft K journaled in J carries a gear segment T fast on one end and the drum R on the other end. The gear segment T meshes with another gear segment U which is mounted loosely on the journal of the frame H'. The arrangement is such that the projections on the dogs Q and Q' engage slots on opposite sides of the drum R.

The action in indexing to obtain a given speed is as follows: Lever M is drawn to the right thereby sliding the drum R which by means of the grooves engaging the dogs Q and Q', draws the shafts S and S' with it. The friction clutches are now in gears C and F, and permit the drum R to be revolved by means of shaft K and segments T and U connected to the handle N. When the handle N is set opposite the speed required, the lever M is drawn back to the former position. This movement locates the friction clutches in the proper gears to give the required speed, and the clutches are then set by means of levers L and L'.

This device, of course, may also be applied to the feeds as well as the speeds of the machine.

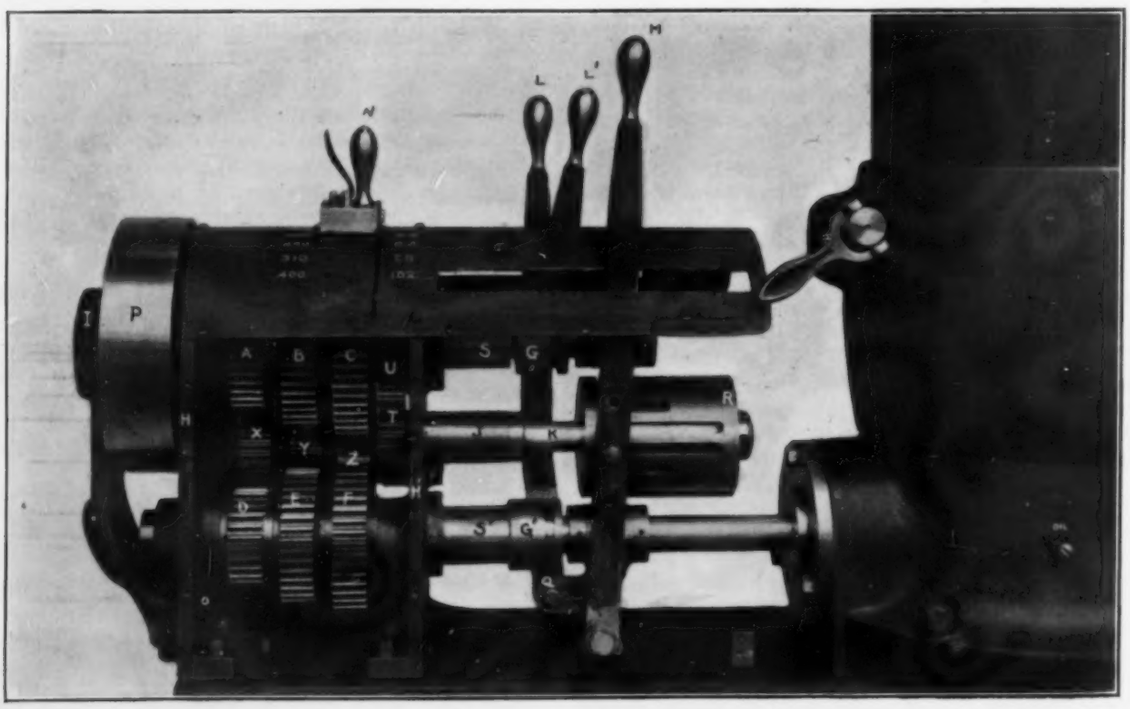


FIG. 2.—SPEED BOX WITH COVER REMOVED.

## Cleveland Machinery Market.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, May 6.

Special inquiry has been made to determine the present condition and prospects of the foreign trade of Cleveland manufacturers. A number have also been asked whether they expect to exhibit their products at the Louisiana Purchase Exposition in 1904.

The Acme Machinery Co. reports that of late it has noticed a slight improvement in its foreign trade and has received recently several very nice orders for shipment to foreign countries. This company expects to have an exhibit at the St. Louis Exposition and has already made application for space. It has booked a number of large orders recently for shipment in this country and the general condition of business in its line particularly seems to be very satisfactory.

The Electric Controller & Supply Co. states that there seems to be a steady increase in foreign trade at the present time and its output for the year is extremely good. The company will have an exhibit of a lifting magnet for handling plates at the St. Louis Exposition. It has a number of large contracts on hand at present, and is making preparations to enlarge its capacity on account of the great demand for its different specialties.

The Marshall & Huschart Machinery Co. does not carry on any of its foreign business through its Cleveland office. All of this company's manufactures will be represented at the St. Louis Exposition.

The Reliance Gauge Column Co. reports that, although its foreign trade is but a small part of its business, it has noticed some improvement in orders for foreign goods. It is shipping this week twenty-one Reliance safety water columns for use on boilers going to South Africa. Reliance steam traps will be installed at the St. Louis Exposition as a working exhibit in the machinery department.

The extra efforts the National Acme Mfg. Co. has been making within the past few months to extend its foreign trade have had some tangible immediate results, and it also looks for additional good trade in the near future. This company made application some time ago for sufficient space at the St. Louis Exposition to show its machines in operation in a liberal way, and it is the intention to make the exhibit a representative one. Orders both with respect to product and machinery are apparently keeping up as well as could be expected.

The Standard Welding Co. notices improvement in the foreign trade, especially in bicycle material going to Denmark and Japan. The company has not definitely decided about making an exhibit at St. Louis, but looks upon the matter favorably. Business averages about the same as it has been for the past 12 months. Everything would indicate that it will continue on about this same scale.

The Federal Mfg. Co. is gratified with the success attending the sale of Hercules steel face pulleys. Many of the best mill supply houses in the country have been appointed agents for the handling of these pulleys. They are made in the company's stamping factory at Milwaukee, the rims being formed of cold rolled sheet steel and the center of wood.

The Elwell-Parker Electric Co. does not itself notice any change in foreign trade conditions for the reason that almost all its products that are exported go through other concerns which use generators and motors in connection with their own machinery manufactured by them. The officers have not yet made up their minds as to their exhibit at St. Louis, but their present inclination is to make one. They do not notice any change, certainly not any for the worse, in the general business condition.

The Cleveland Car Co. has closed one of the most prosperous months of the existence of this concern. It is now building probably more cars to be used in and about steel plants, foundries, rolling mills, brick plants, mines, etc., than any other concern in the United States. The company is now thoroughly settled in its new and commodious shops especially designed for the manufacture of industrial railway equipment.

The Ajax Mfg. Co. is making no shipments and will not for a couple of weeks, as it has not yet recovered from the recent fire.

The "Long-Arm" System Co., manufacturer of ship fittings, does not expect to have an exhibit at the St. Louis Exposition. It has all the work in sight that it can possibly handle in the next two years at full capacity.

The Chisholm & Moore Mfg. Co. does not expect to exhibit at St. Louis. The company is still very busy. Orders are coming in freely and it does not see any immediate prospect of a change.

The Federal Mfg. Co. has made application for a large space at the St. Louis Exposition in the building in which its automobile products will be exhibited. Of the five factories operated by this company, but one is not actively engaged in the production of automobile products. The company states that its Cleveland ball factory makes all the balls which are used in the automobile industry. The Diamond chain factory, at Indianapolis, makes the major portion of the chains which are used for driving automobiles. It is expected that this factory will soon market a chain the characteristic feature of which will be a rocker joint which will reduce friction to a minimum. The chief trouble with chains of the present order is, that under wear they elongate. This elongation, it is claimed, will be scarcely noticeable in the company's new chain. The company's stamping factory at Milwaukee is heavily engaged in the production of heavy and light automobile parts, such as pressed steel frames, tubular running gears, frame parts, front and rear axles, equalizing gears, gear cases, steering levers, steering knuckles, steering wheels, posts and machined forgings of a character generally suitable for automobiles. The company's Garford factory, at Elyria, O., has as its specialty in automobile manufacture the production of motor cycle saddles. The sheet steel mill at Elyria, known as the Columbia Steel Works, rolls sheet steel for many of the parts made in the company's Milwaukee factory. The Elyria plant was designed by the W. P. Rice Engineering Co., Cleveland.

The Garry Iron & Steel Co. has been entering several contracts recently in the structural line, as well as good orders for pneumatic cranes. Among them are steel buildings for the Stirling Co., at Barberton, O.; the Penna. Stave Co., at Sheffield, Pa.; the Massey Machine Co., at Watertown, N. Y.; the Enterprise Glass Co., at Sandusky, O., and the Pearson Co., Boston; two derrick cranes for the J. I. Case Threshing Machine Co., Racine, Wis., and a 2-ton pneumatic crane for the Standard Oil Co., Cleveland.

The Balkwill Pattern Works finds business improving and prices better than formerly.

The Upson Nut Co. finds that the foreign trade seems to be holding up very well although there is not noticeable any great improvement. The company does not expect to have an exhibit in St. Louis. The general situation as seen from its standpoint is for a continued good volume of business at prices which have been in effect for some months past.

The C. O. Bartlett & Snow Co. reports that there is no improvement in its foreign trade and it does not look for any for the reason that labor is so high in this country that we are getting left more and more by English and German competition. The officers do not know whether they will exhibit at St. Louis Fair or not, but rather hope to do so. The company has received a large order for conveying, elevating and drying machinery for a complete plant for zinc ores from the Payne Consolidated Mining Co., Sandon, B. C. It also has several orders for dryers.

The Cleveland Twist Drill Co. has just finished the addition to its factory begun last fall and is moving into it. The addition is 175 feet long, three stories high, and increases considerably the floor space and facilities.

The Cleveland Punch & Shear Works Co. states that its foreign trade is a very small item of its business at present. This it attributes to the high prices which prevail in this country. The company has not as yet decided to exhibit anything at the St. Louis Exposition. It cannot see any falling off in the volume of business in its line, although there are fewer large contracts in sight than there were a few months ago.

The W. W. Sly Mfg. Co., which manufactures foundry appliances, finds quite an improvement in foreign inquiries. It is building eight or nine large mill plants for this country. If orders keep coming in as they have been for the last three or four months, the company will not have an exhibit at St. Louis, as it has more work now than it can take care of.

The Cleveland Elevator Bucket Co. is now engaged in fitting up a large grain elevator in Montreal with elevator buckets.

There is abundant evidence of the prosperity of the business of manufacturing automobiles. The Baker Motor Vehicle Co. has purchased land near Edgewater Park for the purpose of erecting a new plant, but has not yet gotten far enough along with its plans to give detailed information. A number of other manufactures of automobiles are increasing their capacity.

## The Eastern Machinery Market.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., NEW YORK, May 5.

The month of April in the machinery market was not as active as its predecessors for the present year have been. Some of the largest firms report business to have been fully up to that which they have booked in recent months, but the reverse opinion has been expressed by the majority of those consulted.

In machine tools, there was an absence of orders of magnitude, but the buying of small lots was fair. Railroads were the most notable buyers, but in limited quantities at a time. Still the month afforded additional proof that many large propositions from this source are gradually getting into form for submission to the trade, but whether the buying will be for the full quota of tools they represent all at once, or on a gradual scale remains to be seen. Some well known interests incline to the latter opinion.

Prices remain unchanged. Published reports that there have been advances recently in heavy machine tools are not warranted by facts. Discussing the matter, a leading authority says: "The last time prices were advanced on heavy tools was in September, and that advance averaged about 5 percent. There has been no advance since then. I do not think there will be any advance in the immediate future either. Machine tool men are adopting the policy of the United States Steel Corporation, of keeping prices down as low as possible, believing that by doing so they will do much toward giving trade a healthy undertone now, and at the same time help to continue our present prosperous conditions."

Deliveries on the whole have improved, although in some of the standard makes, some complaint is heard. Sales room stocks are now more plentiful than in months, and it no longer happens that the merits of a tool are discussed without the listener being able to examine the tool itself, as was the case not long ago.

In engines the month was noted for a slackening in trade. Manufacturers attributed this to the uneasiness which present and prospective labor disturbances have caused. That they have not as many orders on their books now as they had at this time a year ago is generally admitted. Several concerns which increased their manufacturing capacity during the past year report that they have not enough business on hand now to need all of this increased capacity. Because of the conditions noted, deliveries on old contracts, which caused some dissatisfaction during March, are now better. Better deliveries on new orders can also be promised at present.

In electrical machinery, the activity is for the most part just as pronounced as it has been, although here and there the contrary is heard. The large companies have been favored with some extremely good business during the month, particularly from street railway sources, while the smaller establishments report their share of current trade to be satisfactory.

In special machinery, the greatest satisfaction is expressed with the month's developments. Power-transmitting machinery has been in good demand during the month, and manufacturers have had all they could do to keep up with the orders they have received. In machinist's, engineer's and contracting supplies the good business of the past few months shows no abatement.

The foreign machinery trade for the month showed the same characteristics as for some time past, with the exception of electrical equipment, in which an increasing business is noted. There is every reason to believe, however, that the search for business abroad by American manufacturers during the coming summer, will be much keener than it was last summer, when the field was practically neglected.

During the month definite news concerning new shop installations developed. The International Steam Pump Co. made notable progress in the specifications for the equipment of the new shops of Henry R. Worthington, at Harrison, N. J. It will give the crane specifications to the trade in a few weeks. They will call for 17 electric traveling cranes, in sizes ranging from 10 to 15 tons. The machine tool specifications are still under consideration, and it will probably be two months before they will be out. The Lidgerwood Mfg. Co. is pushing work on its new plant at Newark, N. J. It expects to give to the trade the specifications for the equipment of the power house and foundry in about six weeks. It estimates that this will cost about $150,000. The Chicago Pneumatic Tool Co. expects to purchase the equipment for its new Scotland plant in about six weeks. The outlay will amount to about $150,000. The General Electric Co. is engaged in erecting the 150x600 addition to its Schenectady plant, which was referred to in the March letter. The specifications are almost ready for the trade, and will call for an expenditure of at least $100,000. The Ingersoll-Sergeant Co. is not quite ready to purchase all of the equipment for the new Phillipsburgh, N. J., plant. It has, however, made some purchases in this direction recently, but they have formed only a minor portion of those contemplated. The Westinghouse Electric & Mfg. Co. has not as yet been heard from for the machinery it will install in its new plant at East Pittsburg, Pa., but in some parts of the trade it is thought it will adopt the practice of buying at intervals, instead of at once. Recent purchases would seem to corroborate this view.

With the exception of its crane trade, and in some measure large machine tool orders from railroads, the Niles-Bement-Pond Co. reports the business for April fully up to that which the company has booked in recent months. Inquiries have notably increased of late, and from these and general information that has been given it, the company regards the outlook for machine tools as extremely favorable.

The firm heretofore known as Mackenzie & Quarrier, has been changed into a corporation, under the name of Mackenzie, Quarrier & Ferguson, Inc., and is located at 114 Liberty St., in one of the handsomest suites of offices in the machinery district. The corporation will be the New York representative of the Harrisburg Foundry & Machine Works. Recent sales include one 300-horsepower engine, to the Klotz Throwing Co., Scranton, Pa.; three 150-h. p. engines, to a Cleveland company; one 150-h. p. engine to the American Locomotive Co., for its Allegheny plant; one 125-h. p. engine to the Eddy Valve Co., Waterford, N. Y.; and one 125-h. p. engine to the General Electric Co., for Government lighting purposes, in Manila, P. I.

The Ingersoll-Sergeant Drill Co., of 26 Cortlandt St., found April one of the best months it has had since it has been in business. Orders received by the company were well up in the six figures, one day alone bringing forth over one hundred orders, one of which was for over $20,000. The company has some large orders in prospect, and expects to close them in the near future. A pleasing feature of its current trade is that it embraces all of its specialties, with air compressors standing out prominently on the list.

The Prentiss Tool & Supply Co., of 115 Liberty St., expresses itself pleased with the machine tool situation. The business during April was not quite as heavy as that done in March, which was, however, the banner month of the company's career. It finds lathes to be in excellent demand now. It has added a new Milwaukee turret lathe to its store-room, and has received many orders for it, selling three in one day in the past week.

The Rockwell Engineering Co., of 26 Cortlandt St., has recently booked some excellent orders for fuel oil appliances, with some notable contracts on the verge of closing.

May moving in the machinery district was the smallest that has been witnessed in years. The Railway Appliances Co., manufacturer of pneumatic tools, is now located at 107 Liberty St. Others who have moved into the same building are George E. Affleck, dealer in machine tools, and Wm. J. Reddy, dealer in wood-working machinery. James Beggs & Co., manufacturers of engines, tools, and factory supplies, have moved to 109 Liberty St. The Robert W. Hunt Co., engineers, are now at 66 Broadway.

The Crocker-Wheeler Co., of 39 Cortlandt St., manufacturer of electrical equipment, says that small orders, but in goodly numbers, have characterized recent business. Two of the large orders taken in April were for one 500-k. w. engine type generator, and motors aggregating 385 horsepower, from the Trenton Iron Co., Trenton, N. J.; and four 100-k. w. transformers, from the New York Edison Co. Smaller orders include one 30-k. w. generator, and three 65-h. p. motors, from Platt Bros., Waterbury, Conn.; complete lighting plant, from the Dunbar Box & Lumber Co., New York; two plant equipments, from Western Union Telegraph Co.; and three 30-k. w. engine type

generators, from the French Benevolent Society, New York City.

R. M. Dorsey, who has heretofore acted as general manager for the plants of M. H. Treadwell & Co., with headquarters at Lebanon, Pa., is now connected with the New York office of the company at 95 Liberty St., where he will give special attention to its crane business.

Carl Kratz, of the German machinery house of De Fries & Co., Dusseldorf, is now in the United States to dispose of some $50,000 worth of American machine tools which his firm had purchased some time ago, but has not been able to sell in Germany owing to the general business depression that has existed in that country for a considerable period.

The New Haven Mfg. Co., New Haven, Conn., like most other machine tool builders and manufacturers, is rushed with orders and running full time, finds it difficult to accumulate any stock, and sees no prospect of any change in the situation for some time. In spite of the enlargement of its works and the addition of considerable new machinery of different kinds, it still finds that it is taxed to its utmost to keep up.

The Exeter Machine Works, Pittston, Pa., manufacturers of hoisting engines and elevating and conveying machinery, removed their New York offices on May 1 from 120 Liberty St. to the Hudson Bldg., No. 32 Broadway. J. D. Jenkins is manager.

## LAKE SUPERIOR IRON MINES.

April shipments of ore from Minnesota are larger than was expected possible, and will come pretty well up to early anticipations. On other ranges the total is lighter than looked for. Dock capacity and rolling stock have bothered some of the roads. The new ore dock of the Wisconsin Central has not been completed, nor is that of the Great Northern ready yet, though both will be very shortly. Large numbers of new 100,000-pound cars for the Duluth, Missabe & Northern and Duluth & Iron Range have been arriving the past week. These cars differ from former steel car models in that they are built to dump both sides from either side the car, a feature of importance and one that offered quite a problem to car builders. This will save a good deal of time at the ore docks and will make work there less dangerous. New trackage, both main lines and mine spurs, is going in very fast on all the Minnesota roads. The D., M. & N. has built and will soon connect up a cut-off to its main Hibbing line that will eliminate curves and bridges and shorten the line a trifle, also a spur to the Shenango and Chisholm. The latter has shipped over the Great Northern but its new shaft will be connected with the D. M. & N. The same road is also moving and shifting its tracks in the vicinity of the Morris and other mines near Hibbing. The Great Northern has its new line from Kelly lake to Buhl about half graded and will be using it this year. It passes to the south of all the mines of Hibbing district, where much ore had been tied up by its former location. Its double tracking of the main Virginia-Duluth line is progressing and its Nushwauk extension is soon to start. It is also building to more mines. The Duluth & Iron Range is doing little but enlarging sidetrack facilities, but is doing this all along the road, especially in the Fayal neighborhood.

A shaft is being sunk at the Chisholm mine, near Hibbing, by the process invented and patented by Capt. Samuel Hoar, of Ishpeming. This shaft is being sunk in a swamp with considerable quicksand. There is a shaft frame surrounded by steel lath set vertically, and these are driven down ahead of the sets, the sand pumped out from inside them and the sets pushed down inside. The fact that these lath are separate and therefore adjustable, is a matter of considerable importance in this work.

At the village of Norway the United States Corporation, owning the Aragon, has been confronted with a problem by reason of the sinking of the townsite over the mine. The company has platted an addition to the town and for a week has been selling lots to intending purchasers at the rate of $6 a front foot or more, under such provisions that buildings of good character must be put up soon. The new village will be improved in a comprehensive and skillful way, far better than it would be if left to the residents' cash and judgment, and the new Norway will be a great improvement on the old.

D. E. Woodbridge, who is exploring the new part of section 15 58 19, and has two holes in ore, is putting on a second drill and will push the exploration. It is probable that he has a large ore deposit there.

The Zenith Furnace Co., which is now mining south of the old Cincinnati location at Biwabik, has started a shaft a mile west of the same village and is to open about 150,000 tons of good ore it has found there. This is the smallest deposit of ore ever opened into on the Mesabi range and is an evidence of the thorough manner in which work is now done, as well as of the difference in ideas of what constitutes an ore body from those that prevailed a few years ago in that district. The company has abandoned most of the work it has had under way during the past winter east of the Mesabi station of the D. & I. R. Railroad, and has found very little of promise there. This company has commenced foundation work on the Otto ovens it proposes to build at its furnace and will make their capacity about 300 tons of coke daily, instead of less as was planned.

Three shovels are in ore at the Mahoning mine and are loading 5,000 to 6,000 tons a shift. At most of the open pit mines shovels are idle on account of a dispute over wages of cranemen and runners, and the product is smaller than it will soon be. A leading earth contracting firm precipitated the difficulty by making season contracts with its shovel runners at higher prices than had been paid and with a promise of bonus at the close of the season.

The Consolidated Lake Superior Co., of Sault Ste. Marie, that has been doing some exploration in Minnesota, has stopped work and will do no more at present.

Ore is coming from a number of the newly opened mines of the western Mesabi in considerable quantity already, and more will get into line very soon. These mines will make a large contribution to the season's output and are a very important factor.

The McLeod Iron Co., Duluth, has decided to incorporate with a capital of $500,000. It owns the McLeod homestead on the Highland range and will put in a diamond drill and churn drill at once.

The Great Northern's new ore dock at West Superior, Wis., will be ready for shipping ore in a few days.

## German Competition Not Feared.

Concerning the report that the recently organized consolidation of iron and steel companies in Germany will make an effort to get a share of the iron and steel trade of the United States, an official of the United States Steel Corporation has been quoted as saying:

"Germany is practically cut off from the United States now," said an official of the Steel Corporation. "All imports of pig iron and steel products from Germany from now on will be in satisfaction of contracts made months ago. Should it become necessary the southern manufacturers would make still further reductions in the price of pig iron but the recent cut of $1 per ton will probably prove effective. It is a trade fact that American iron and steel can be produced, if necessary at prices considerably lower than present schedules and still return a fair margin of profit. An effort on the part of Germany to cut prices or to inaugurate a war for trade here is bound to result disastrously to Germans. The situation here, which permitted the importation of so much German iron was an abnormal one. Three years ago we were selling iron in Berlin. As soon as the production here equals the demand, which may be within a comparatively brief period, we will again compete in the markets of the world—and we will get our share of trade."

The S. Obermayer Co., manufacturer of foundry facings, supplies and equipment, is making large improvements at its Chicago plant, Eighteenth and Rockwell Sts. New machinery and new buildings have just been completed, which adds about 40 percent to the present capacity at this plant. In the past year improvements were made at the Cincinnati plant, also at the Pittsburg plant, doubling the capacity at both places. The S. Obermayer Co. has now these three plants in full operation running each twenty hours a day, all being equipped with the most modern machinery.

## Philadelphia Machinery Market.

May 5.

Another month of heavy business in the machinery trade has just closed. The situation lacks little of the strength which has characterized it for a long time, and the only disquieting feature in all lines comes from the labor question, which is assuming proportions tending to cause alarm. In machine tool circles a great deal of business is kept out of the market through the various reports in circulation as to the probable action of the labor unions in the very near future. Manufacturers are evidently moving very slowly in the matter of adding to existing equipments. While the machinery trade in Philadelphia is very little affected at present, outbreaks are expected to come at any time.

Prices of machine tools appear to be pretty well maintained, and the report that higher figures are being obtained for heavy tools is not well grounded. As a matter of fact, in the quarter where an advance would be most expected, prices seem to be weaker than elsewhere. This is particularly noticed in regard to lathes. It may be that prices in all lines will have to be advanced shortly, but builders are at present satisfied with existing prices.

There is great difficulty everywhere experienced in getting castings, both iron and steel, and there does not seem to be much prospect of early relief. About 500 molders are locked out of the Chester foundries, the source of supply for many Philadelphia machine shops, and much inconvenience is caused by the loss of product resulting. Three and four weeks after receipt of orders seems to be the time required to furnish ordinary iron castings, and as much as three months for steel castings.

Foreign business is picking up somewhat, both inquiries and orders being more prolific than for some time.

Collections on the whole are considered pretty good. Engagements are being met with fair promptitude, and less accommodation in the way of renewals of paper is asked.

The contract for the new plant of the Hale & Kilburn Mfg. Co. has been let, and building will be at once begun. The machine shop as planned is to be 204x70 feet, one story.

The contract for the new foundry at Eddystone, to be erected for the Sterlingworth Railway Supply Co., has been awarded to the McClintock & Marshall Co., of Pottstown, Pa.

The Newton Machine Tool Works continue very busy, and April was a very heavy shipping month. They are badly in need of more floor space, and work on the extension to their plant is being pushed. It is now ready for the roof, but a strike among the carpenters may delay completion for some time. The concern is about to ship a large armor plate saw to Homestead, Pa., the largest ever built. With the bed it will weigh 150,000 pounds. They are also preparing for shipment to the American Locomotive Works, Schenectady, N. Y., an immense vertical milling machine, weighing 60,000 pounds. Last month they made some heavy shipments of crank planing machines to the Penna. R. R. and Bethlehem Steel Co. They state they are meeting an unusually heavy demand for slotting machines. Among orders recently secured they mention one from T. H. Symington, Baltimore, Md., for thirty small rotary planers for milling faces of journal boxes.

The Espen-Lucas Machine Works are quite busy at their plant. They have several orders for floor boring machines and cold saws in hand, and are rounding out the first year of their establishment under excellent conditions. They are about to install some additional tools in their plant.

The Hess Machine Works, builders of file making machinery, have a good deal of work in hand, nearly all on foreign orders.

Wm. Sellers & Co., Inc., have a great many large orders on their books, and all departments of their works are active.

Israel H. Johnson, Jr., Co., builder of lathes, made some heavy shipments during April, among them a 42-inch lathe to Alabama, a 36-inch lathe to Ohio, and a 48-inch lathe to a point in New York State. Among the orders received were several for 54-inch, 48-inch, 42-inch and 36-inch lathes. Both orders and inquiries appear to be in plenty.

The Falkenau-Sinclair Co. found April a very good month. Its shipments covered mainly standard presses and tools. Several testing machines were shipped, and four small lathes went to the U. S. Government. From the special machinery department was shipped a 5,000-h. p. turbine governor to the Niagara Falls Power Co. The company is getting some foreign business, and last week made a good shipment of presses to England.

The Wilbraham Green Blower Co. reports business good. It has been making some good shipments of pressure blowers and exhausters of late.

The Forbes Co., builder of sterilizing apparatus, has just installed a double sterilizer in the station building of the Penna. R. R., having a capacity of 250 gallons of sterilized water per hour. All the water used in this large building is to be sterilized.

### Civic Federation Conference at Chicago.

A national industrial conference, to which will be invited prominent labor leaders, manufacturers and capitalists, leading statesmen and others, will be held under National Civic Federation auspices in Chicago early next fall. This was decided upon at a meeting of the Federation held in Chicago, Monday, May 4, at which Senator M. A. Hanna was present. At the same meeting, initial steps were taken for the formation of a local branch of the National Civic Federation, to act as an auxiliary to the various local organizations for the promotion of the arbitration idea for the settlement of all labor disputes. Senator Hanna made a vigorous plea for a closer relation between employers and employes. He contended that employers should be willing to go more than half way to gain this end.

"I believe in organized labor," he asserted. "I have dealt with it for thirty years, and during that time I have had little trouble with those in my employ. That was my early education, and every step has more and more satisfied me that this is the method to lead to industrial peace. It is simply a question of confidence; of the determination of both sides to be fair and to do right by each other. There is always a middle ground on which men can meet. There is right and wrong in each controversy. But one side must be right and one must be wrong. I can cite my own experience to show that never have I found the workingmen not ready to go half way or amenable to reason.

"There are factors in this question which are above the question of wages—the question of what we owe to humanity and to society. Elevate labor. Men are coming here from all parts of the world to better their lives. They come from labor organizations of England, of Germany, of other countries. I believe in organized labor, but I believe it should be Americanized and along the spirit of our country."

Among the labor leaders present at the meeting were John Mitchell, of the United Mine Workers of America; Albert Young, president of the National Teamsters' Union; Daniel O'Keefe, president of the International Longshoremen, Marine and Transport Workers; Judge Tuley, of the Chicago bench, and several prominent citizens of Chicago.

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The recently incorporated Chapman-Baker Machine Works, San Francisco, is a continuation of a business formerly conducted by R. S. Chapman & Baker. The machine shop is a branch of the fire department machinery and apparatus business of the company, although it does quite a line of outside work and employs from six to ten men. The company has had constructed a new brick building, 40x75 feet. One of its specialties is the rebuilding, modernizing and providing with new boilers, etc., the steam fire engines in California.

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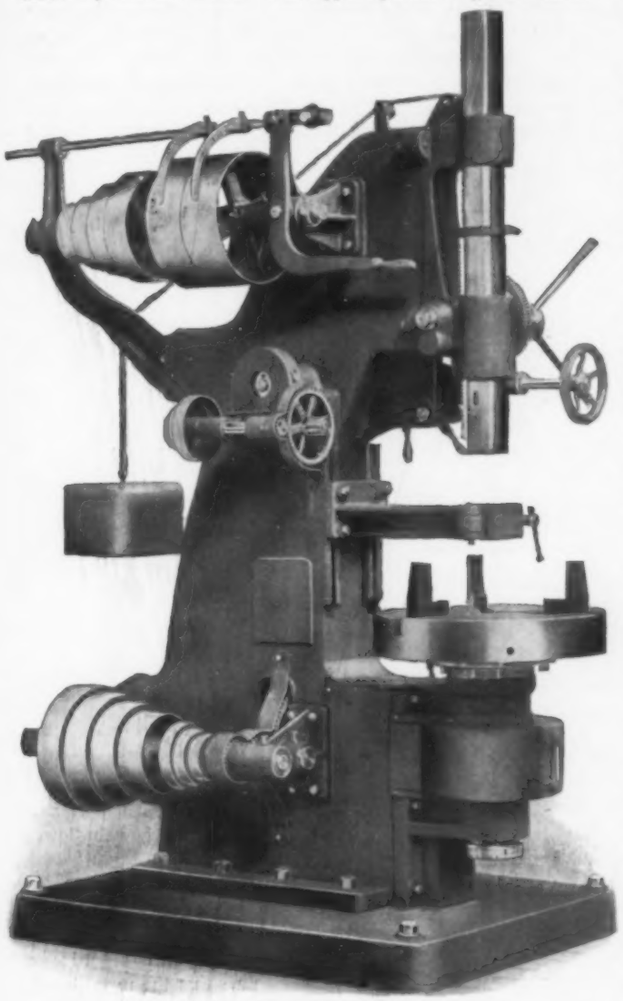
Concerning reports that the United States Shipbuilding Co. is to be reorganized and that it needs $5,000,000 of new working capital, President Lewis Nixon says the only foundation is that if the company wishes to take care of the volume of business which seems assured it must increase its facilities. He adds: "As the experience of others shows how unwise it is to encroach on working capital for additions, we have discussed very freely with our management the various ways in which such additions might be handled."

## BAKER WHEEL-BORING MACHINE.

This wheel-boring machine is a recent product of Baker Bros., of Toledo, O. The main frame of the machine is made in one piece and cored out. It is made in two styles, one to swing up to 28 inches in diameter, and the other up to 36 inches. Both machines are practically alike except that the one has a greater swing than the other. The following special features are combined in this tool: An automatic power feed, lever feed, and a worm feed, automatic stop and quick return for spindle. The arrangement of the parts is so combined that any of these feeds can be used independently of the other and with the greatest ease on the part of the operator. The feeding mechanism is very substantial, the worm gear being made of steel and driven by a hardened steel worm running in an oil bath. The machine is designed for boring and reaming small car wheels, long sleeves, collars, bushings, wheel hubs for agricultural implements, etc. The lower spindle rotates and has a flange at the upper end, to which may be secured any suitable chuck. The upper spindle is 4½ inches in



A WHEEL-BORING MACHINE.

diameter, is solid and counterbalanced. It has a vertical feed of 20 inches but does not rotate. The hole in end of upper spindle is made to fit a No. 5 Morse taper shank. The lower spindle is 4¼ inches in diameter and has a hole from end to end 2¾ inches in diameter. The distance from the upper spindle in the highest position to top of lower spindle is 27 inches. From this an allowance of 7 inches should be made for the chuck.

The thrust on the lower spindle is taken on hardened tool steel roller thrust bearings. These are thoroughly protected from dust and grit by a guard which completely covers them. The lower spindle has four changes of speed and there are six feeds for the upper spindle. A supporting bracket is adjustably attached to the main frame on the guides, and bushings can be employed to steady the boring tools if desired.

The countershaft is mounted directly on the upper part of the frame, and is controlled by means of a lever located in a convenient position. The speed of the countershaft should be 250 revolutions per minute. Tight and loose pulleys on the countershaft are 14 inches in diameter by 4 inches face.

## NATIONAL ASSOCIATION OF STOVE MANUFACTURERS.

The thirty-second annual meeting of the National Association of Stove Manufacturers will be held in Cleveland, May 13 and 14. The officers of the association are: President, Albert N. Parlin, Boston; vice presidents, Frederic W. Gardner, Chicago, and Frederick Will, Rochester, N. Y.; treasurer, Walter S. Stevenson, Philadelphia; general secretary, Thos. J. Hogan, Chicago; board of managers, J. W. Van Cleave, St. Louis; J. W. Boehne, Evansville, Ind.; A. W. Walker, Boston; W. J. Myers, New York; W. H. Cribben, Chicago; honorary member, Frederic W. Gardner, Chicago.

After receiving the reports of officers, the following subjects will be considered:

Consolidation: Are there any new phases of this subject?

Costs: Do the changes in the stove business, which have been made since the present form was adopted, justify any change in the methods of computing costs?

Equalization: What is the fairest method for determining the relative value of different goods? Is it advantageous and beneficial to the stove manufacturers?

Cast Discount: Is it desirable to have a uniform cash discount of 2 percent in all districts? What is the experience of the districts that have reduced the cash discount from 5 percent to 2 percent?

Cooking Exhibits: Is it not a great mistake for leading manufacturers to encourage this expensive method of advertising their goods? Should it not be abolished?

Molding Machines in Stove Foundries: Are they desirable, and can they be used with profit to the stove manufacturer?

Polishing Machines: Can they be used with profit to the stove manufacturer? Is the work turned out equal to work done by hand in the ordinary way?

Traveling Salesmen: Which is the most desirable from a serviceable and profitable point of view: The experienced or professional salesman who demands a large salary and is ready to change at any time to the highest bidder or the young man whom you may have educated and started out on the road?

Co-operation Between District Associations: To what extent is this possible, and how can it be brought about?

Breakage in Transit: What can be done to lessen the loss from breakage in transit?

"Catalogue House" Business: What effect is it having on the general trade, and what can be done to help the retail dealer along this line?

Packing Goods for Foreign Shipment: The complaint is universal that Americans do not understand this part of their business, and are constantly losing desirable trade on that account. What is the remedy?

Welfare of the Association.

The following arrangements have been made by the committees having in charge the entertainment program, to be carried out during the convention: On the evening of May 12 there will be a theatre party for the gentlemen and ladies. On the afternoon of May 13 there will be a trip to the Olney Art Gallery, and a concert in the parlors of the Colonial Hotel by the Cleveland Philharmonic String Quartette for the ladies. On the evening of May 13 there will be a smoker for the gentlemen in the palm garden of the Hollenden Hotel. On the afternoon of May 14 there will be a drive for the ladies and gentlemen through the principal parts of the city, to the Euclid Golf Club, where a luncheon will be served.

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The construction of the new coke ovens at the Zenith Furnace Co.'s plant at Duluth was begun a few days ago. The contract made by the furnace company and the city calls for the furnishing of gas by Jan. 1, 1904. Twenty ovens are to be constructed with a capacity of about 125 tons of coke a day.

# Mecader Hollow Pressed Axles.*

BY CAMILLE MECADER, PITTSBURG.

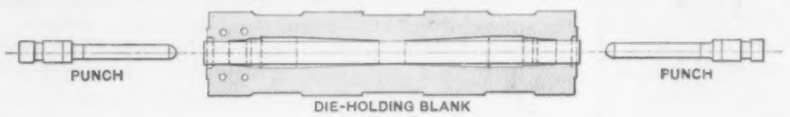
The axle is one of the most important elements used in rolling stock. Upon its strength depends the safety of the whole car superstructure, and upon its freedom from friction the economy in draft. While improved forms of construction have been devised in every branch of the railroad equipment, the axles for tenders and cars have been rather neglected, and this portion of the equipment has only kept pace with the other improvements by increasing its size and weight to gain the strength necessary for supporting the greatly increased loads which are now considered standard. A few years past, who would have thought of 110-pound rails, 125-ton engines, 110,000-pound steel cars and the many other improvements now considered necessary for the economical operation of our great railway systems?

It is a well recognized fact that steel articles manufactured by pressing are, as a rule, superior to articles made by any other method, and the present tendency is to develop this method in every branch of the iron and steel trade, especially as it insures the most economical production of articles needed in considerable quantities and makes them perfectly true and uniform to the templet, permitting interchange of parts or the making of standard sizes. The writer proposes, in the present paper, to present briefly an account of the development in the manufacture of railroad axles on a large scale which was successfully demonstrated and accomplished at the Homestead Steel Works of the Carnegie Steel Co., Pittsburg, Pa.

In order to produce by pressing an axle having varying diameters, the following method was proposed by the writer: A rolled round steel blank, uniformly heated, is inserted into a two-part die, having a matrix cavity in the form of a rough turned axle. The diameter of the journals is made equal to the smallest diameter of the axle in the center, which corresponds to the diameter of the round blank. After the dies are clamped about the heated round the latter is axially perforated simultaneously at both ends by two cylindrical punches, which force the metal of the blank to conform to the shape of the matrix die and fill out the same. The round is heated up to about 1,000 degrees C. and the total hydraulic pressure required for penetration with a punch of 3 inches diameter amounts to about 50 tons. During the last end of the stroke a total hydraulic pressure of about 150 tons is required because the blank loses its initial heat through contact with the dies and because the end collars upset, at which time the metal may flow back against the punch.

Considering the small diameter to be pierced and the length of the punch, this pressure required to penetrate the blank is apparently very small, and it will be conceded by all familiar with the work that a prerequisite to entering the blank lies in allowing the metal to flow freely in the direction of the forward movement of the punch. The presence of the annular spaces between the blank and the die fulfils this condition, the metal flowing radially in the direction of the least resistance; the only back flow against the punch is at the end of the stroke. It is obvious that if this back flow existed initially the punch would bend and buckle before entering any great distance. In order to facilitate the initial entering of the punch the blank is now gripped by the dies for a length of only 4 inches at the journal portions, thus allowing the metal to flow more easily. (See Fig. 2.)

The punch, being tapered, acts as a wedge and the pressure that can be exerted upon the axle blank is consequently enormous. In one of the experiments the heated blank happened to be smaller in diameter than the gripping portions of the dies, and hence was not clamped by them. In this case the punch pushed the metal endwise and upset the blank into the matrix die. The inability of the metal to flow against the punch caused the upper die head, a steel casting weighing 25,000 pounds, to spread, and under a pressure of 200 tons upon the punch the die and the die head broke in the center. It is interesting to note that in this case the punch did not bend in the least, notwithstanding the fact that the blank, instead of being formed round, was compressed into an elliptical section, its upper part next to the top die having ½ inch more metal than the lower portion. (See Fig. 3.)



DIE-HOLDING BLANK
Fig. 1

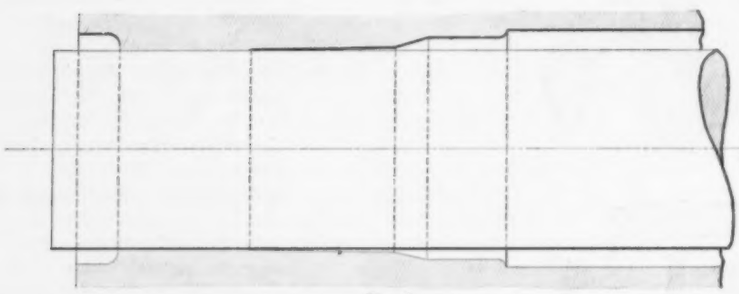


Fig. 2

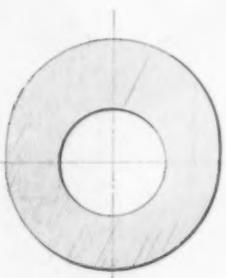
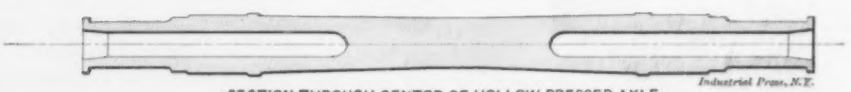


Fig. 3



SECTION THROUGH CENTER OF HOLLOW PRESSED AXLE
Fig. 4

FIGS. 1–4.—SECTIONS OF HOLLOW PRESSED AXLE AND DIE.

The strength of the cast steel die head was determined upon the basis of ultimate tensile tests of its material, and it was found that a total lateral pressure of 2,600 tons must have been exerted by the wedge action of the punch in order to break this casting. This occurrence shows that the metal blank, in being punched, can be subjected to an extraordinary pressure. This pressure is exerted throughout the entire length of the axle blank, for it is found that the central part of the axle, where the punch does not penetrate, conforms to the shape of the dies. (See Fig. 4.) It cannot be disputed that this great compression improves the quality of the steel in the central part of the axle by destroying the injurious effects of segregation and piping usually found in ingot steel.

Regarding the temperature of the heated blank, it may be mentioned that it is absolutely necessary to have the greatest uniformity throughout the body of the blank, the temperature determining the resistance which the punch must overcome. The following table, given by Dr. Julius Koleman, showing the decrease of ultimate strength for medium hard steel for increased temperatures, may be of interest. The temperatures are given in degrees centigrade and the fiber stress in kilograms per square millimeter:

*From a paper read at the May meeting of the Iron and Steel Institute, London, Eng., May 5-7.

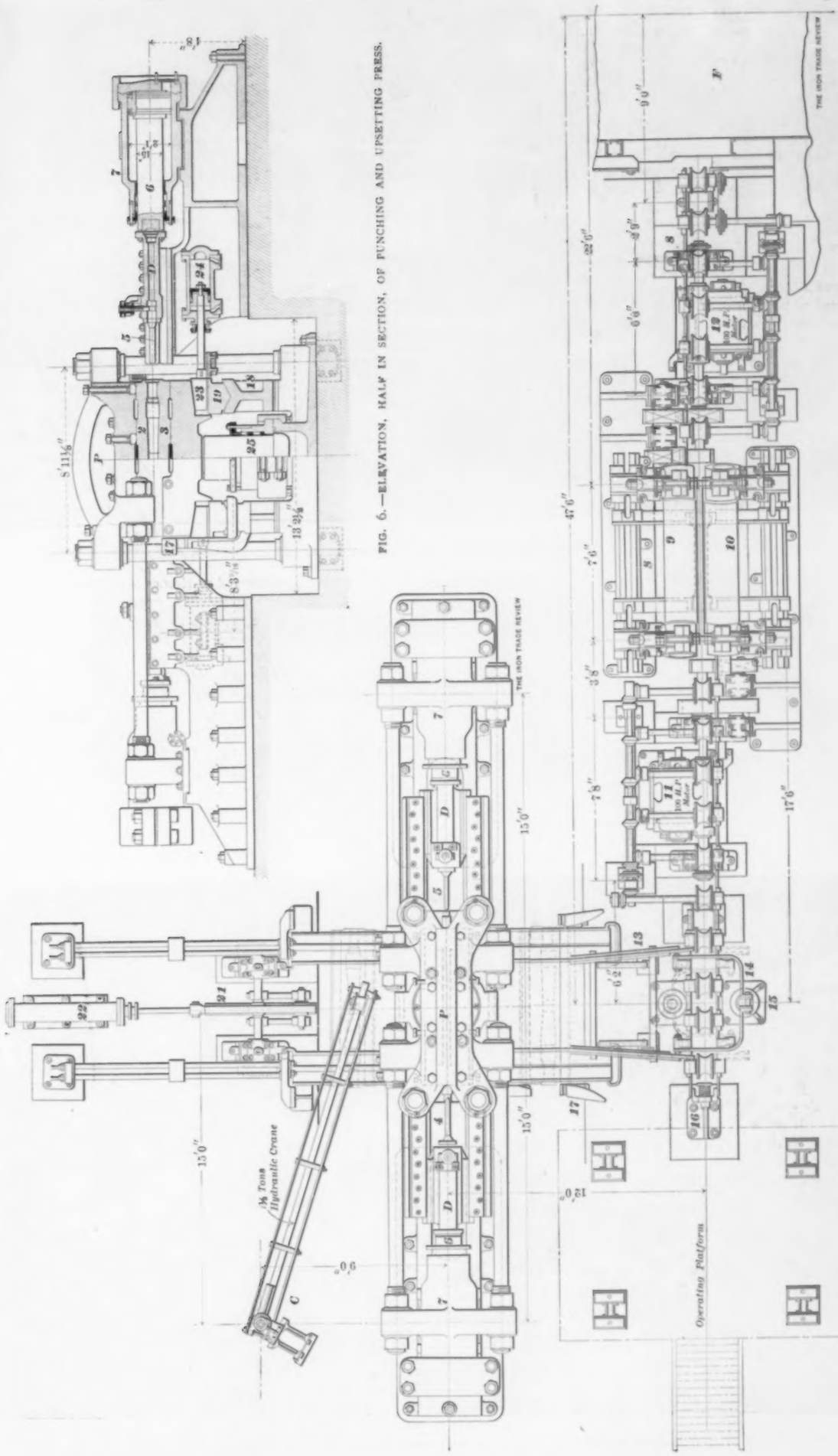



FIG. 5.—PLAN VIEW OF FURNACE, CROSS ROLLS AND PUNCHING AND UPSETTING PRESS FOR THE MANUFACTURE OF HOLLOW AXLES.

FIG. 6.—ELEVATION, HALF IN SECTION, OF PUNCHING AND UPSETTING PRESS.

FIG. 7.—PUNCHING AND UPSETTING PRESS.

*Decrease of the Ultimate Tensile Strength by Increasing the Temperature.*

| Temperature. Deg. Cels. | Tensile strength. Kilograms per square millimeter. | Decrease of T. S. Per cent. | Temperature. Deg. Cels. | Tensile strength. Kilograms per square millimeter. | Decrease of T. S. Per cent. |
|---|---|---|---|---|---|
| 0 | 59 | 100 | 650 | 12.5 | 22 |
| 50 | 59 | 100 | 700 | 10.5 | 18 |
| 100 | 59 | 100 | 750 | 9.1 | 15 |
| 150 | 58.9 | 100 | 800 | 7.9 | 13 |
| 200 | 58.9 | 100 | 850 | 6.5 | 11 |
| 250 | 57.75 | 98 | 900 | 5.4 | 9 |
| 300 | 55.5 | 94 | 950 | 4.75 | 8 |
| 350 | 47.5 | 80 | 1,000 | 4 | 7 |
| 400 | 32.2 | 55 | 1,050 | 3.6 | 5 |
| 450 | 24.1 | 41 | 1,100 | 3.2 | 5 |
| 500 | 20 | 34 | 1,200 | 2.4 | 4 |
| 550 | 17.5 | 30 | 1,400 | 0 | 0 |
| 600 | 15 | 26 | | | |

The experiments performed at Homestead gave evidence that the lower limit of temperature for successful punching was reached at about 850 degrees C., as near as could be judged. At this temperature the punch entered with difficulty, requiring about 250 tons initial pressure and about 500 tons final pressure for upsetting the collars; the metal, however, filled out the die very nicely, producing a fair looking axle. At a temperature of about 950 degrees C. the pressure required at the end of the stroke amounted to about 250 tons, and at about 1050 degrees C. a pressure of about 150 tons was found to be sufficient. In testing these axles Pennsylvania Railroad drop test specifications were followed—viz., seven blows at 43 feet of 1,640 pounds weight, striking midway between supports 3 feet apart; axles to be turned over after every other blow. The axles, having stood this test, were subjected to further blows until

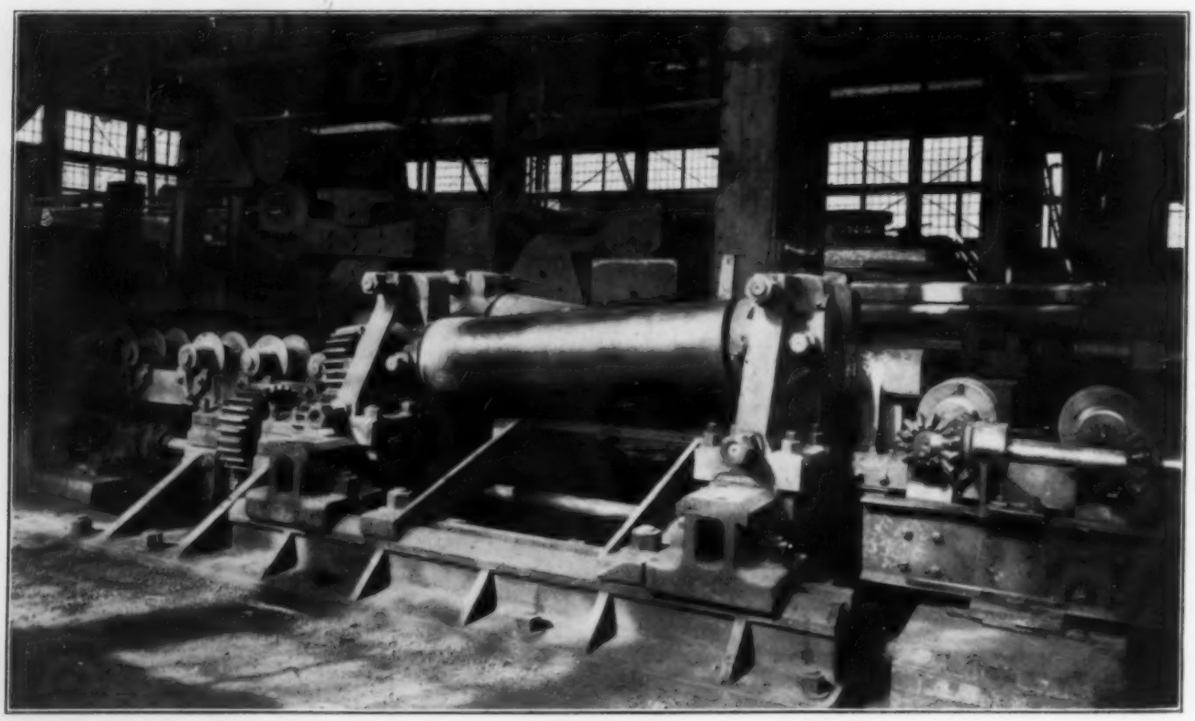


FIG. 8.—CROSS ROLLS FOR STRAIGHTENING AND ROUNDING THE BLANK.

destruction. [The author gives details of these tests, the axles in each case having 5⅞ inches center diameter and 5½-inch journals. The weights were: 710 pounds for the axle forged at 850 degrees; 705 pounds for that forged at 950 degrees, and 700 pounds for that forged at 1,050 degrees. No. 1 (850 degrees) broke in the center at the 72d blow; No. 2 broke in the center at the 56th blow; No. 3 broke in the center at the 37th blow. The analysis of the steel in No. 1 was: Carbon, 0.39 percent; phosphorus, 0.024 percent; manganese, 0.47 percent; sulphur, 0.026 percent. No. 2 steel was 0.42 in carbon, 0.02 in phosphorus, 0.50 in manganese, and 0.02 in sulphur. No. 3 steel was 0.54 in carbon, 0.67 in manganese, and 0.03 in phosphorus. This last steel was too hard, having an excess percentage of carbon and manganese, which is also shown by the deflection of only 3⅞ inches after the first blow in the drop test. After rupture, which occurred at the center, the two halves of the axle were weighed and the difference in weight was only 2 pounds, demonstrating the exactness of the shape and the uniform compression throughout the axle.]

### Machine for Forging Hollow Axles.

In order to demonstrate the practicability of manufacturing railroad axles on a large scale by means of punching, an experimental machine, designed by the Carnegie Steel Co., was erected at the Homestead Works, according to accompanying drawings. In Figs. 5 and 6 P represents the punching and upsetting press, having two dies, 2 and 3, between which the metal blank is clamped and shaped. The dies have a matrix cavity, giving approximately the shape of the finished axle. The two upsetting punches, 4 and 5, are adapted to enter the matrix cavity longitudinally, being guided by a cross head D and moved in a longitudinal direction by the plungers, 6, of hydraulic cylinders 7. The punches are made sufficiently long and the plunger is given a sufficient stroke to enable them to penetrate the axle blank lengthwise beyond the wheel seat of the axle. F is a continuous furnace of the Howard Axle Works type, and 8 is a feed table for conveying the blanks. Between the furnace and the press is a straightening machine, S, composed preferably of a pair of cross rolls, 9 and 10, driven by two 100-horsepower electric motors, 11 and 12. These rolls are adapted to receive the blank, cause it to traverse longitudinally and rotate, and by such travel and rotation straighten and round the blank perfectly. The diameter of the cross rolls being unequal, the blank is pressed against a bottom guide placed the entire length between the rolls, thus removing all scale and delivering the blank to the press with a clean and smooth surface; see Fig. 10. The cross rolls make 160 revolutions per minute and the blank traverses 5 inches per revolution, requiring about 12 seconds to pass through them. A feed table conveys the blank to a position opposite to a lateral transfer device, 13, composed preferably of inclined skids and of a tilting frame, 14, which may be operated by a hydraulic cylinder, 15. When in this position the axle blank is stopped by coming into contact with a buffer, 16, whereupon the frame 14 is raised and the straightened blank is caused to roll down upon the bottom die 3, which is movable laterally upon a slide, so as to carry the blank under the upper die of the press. During its passage to the die the blank is guided at its ends by guides, 17, which center it lengthwise to suit the die cavity. To effect the lateral or traveling movement a lateral track, 18, is provided, upon which are mounted slides, 19, and upon which the die head 3 when in its lowest position rests and by which it is engaged. These slides are connected by a cross head and by gearing, 21, to the piston of the hydraulic cylinder, 22, and by the operation of this cylinder the slides carrying the die head and the dies are moved back and forth to the positions shown in the drawing. Wedges 23 are mounted under the operative position of the die head and are moved by hydraulic cylinders, 24, forwardly underneath the die head, in order to support and lock it when elevated. The lifting of the die head 3 is effected by the plunger 25, which is set directly beneath the operative position of the die head, the axle blank being gripped and held thereby at the center and at the journals. To retain the dies in this position and to withstand the outward pressure exerted during the forging operation, the wedges 23 are projected under the die head.

The dies 2 and 3 being thus locked by the wedges, the piercing punches 4 and 5 are brought into engagement with the ends of the axle blank, whereupon the punches penetrate the blank, pass beyond the wheel seat portions and displace the metal of the axle blank outward, so as to fill the cavities of the dies, forming the wheel seat and taper of the axle of the proper size and contour. The rear portions of the punch engage the ends of the axle blank and force them inwardly toward the die cavity, and thus, by compressing them, shaping up these ends and forming the collars. The forging of the axle is then completed and it only remains to remove it from the machine and subsequently to turn the journals and wheel seats. To remove the axle the punches are retracted, the wedges are pulled back, the plunger lowered and the lower die head, with the axle, is carried on the slides to the opposite side of the machine. A hydraulic crane, C, having suspended a beam carrying hooks to enter the open ends of the axle, removes the same from the die and transports it to the cooling bed. The slides are then retracted into the first position to receive the new axle blank and the operations above described are repeated.

FIG. 9.—MECADER HOLLOW FORGED AXLES, ROUGH AND FINISHED.

The construction and the length of the press make it exceedingly difficult, if not impossible, to keep the hydraulic cylinders, the cross heads and the forming dies in a permanently correct alignment; therefore the ends of the piston rods were made to engage a ball bearing mounted in the cross heads, rendering the cylinders independent of the other parts of the press, so that only the forming dies need to be aligned correctly with the cross heads holding the punches. To bring the cross heads holding the punches into a perfectly straight line with the dies the cross heads rest upon false plates, which can be raised or lowered by wedges, allowing adjustment of the hight, and the guides are made adjustable by set bolts, giving adjustment in all directions. Similar means are provided for the adjustment of the upper matrix die to make it conform with the punches in case the dies are exchanged.

### Material for the Punches and Dies.

Many experiments have been made regarding the material for the punches. Water cooled tool steel punches with cast iron points removably secured were first tried. Such a punch

afforded the necessary stiffness, and the cast iron nose withstood heat to a great degree, being self-lubricating and not liable to become welded within the blank. The securing of the cast iron nose to the punch was found, however, to be too weak, owing partly to the small diameter of the punch and partly to the fact that having at that time no cross rolls, the blank was not straight, and the punch followed the course of the blank and hence fractured, the nose breaking and remaining in the axle. Solid crucible steel punches were then tried, but it was found that by the great pressure exerted the point of the punch welded to the axle blank, requiring great power to extract it. The point of the punch was covered with steel from the blank and was ragged, and therefore unfit for a second operation. To avoid the welding the punch was entered first for only 6 inches, then removed, the cavity filled with hard coal and the punching operation finished. The punch, being sufficiently lubricated by the gases from the coal, did not weld, but was caused to deviate on account of the coal not being evenly distributed around the punch. Solid charcoal iron punches were thereupon tested, but under the great pressure required for penetration they bent before entering the blank, deviating accordingly. If the temperature of the blank was high enough the deviation amounted to only about 1-16 inch, but if the steel was too cold the punches broke in the outer part, the broken end remaining in the axle.

In figuring the strength of these punches 35 tons are required to make them deviate 1-16 inch, showing again the small pressure required for punching. On the other hand, this deviation necessarily followed from the fact that the length of the punch was eight times its diameter, whereas it should not be over five times, according to accepted authority for cast iron. It may be 12 times the diameter for steel, or even more, according to percentage of carbon and treatment. As a result of these experiments, and following the practice of the Ehrhardt Works in Montbard, France, high carbon Bessemer steel containing 0.9 to 1 percent carbon was adopted and the punch was found to be very stiff. To overcome the difficulty of the welding the ends of the punches were provided with drop forged steel caps; see Fig. 14. These caps rest on the point of the punch, fitting the same neatly, and are a little larger in external diameter than the punch, in order to avoid friction between punch and the blank, resulting in a minimum of pressure required for penetration. By the pressure the caps are welded to the blank. The punch, being protected from injury, is very easily withdrawn, and, after cooling, it is ready to receive a new cap for the next operation. This arrangement proved to be very satisfactory and practical. The caps can be made very cheaply, drop forging same from steel plates or skelp preferably made of axle steel. In order to avoid heating up of the punches the same are preferably black leaded, this being carried deep into the blank, the pierced hole having a greater diameter than the punch, owing to the slightly larger size of the cap.

The results due to the intermediate straightening of the axle blanks are of the greatest practical importance for the preservation of the punches, as it saves them from bending. It is evident that if the blank reaches the dies in a bent condition, owing to the presence of the cavities, the blank will be straightened only in those parts gripped by the dies, leaving the blank unsupported between the journals and the center. The piercing punch, entering the center of the blank and having equal resistance in all directions around the punch, will follow the center of the blank; consequently, if there is a bend the punch must deviate.

The material employed for the matrix dies is best machine cast iron, water cooled to prevent a change in the shape and dimensions of the cavities. The dies show very little signs of wear and tear, and it appears that they will withstand the punching of a great number of axles, since the slight wear only smooths the inner surfaces of the dies. Further experiments in this direction might lead to the adoption of cast steel dies. To remove the axle readily all corners of the die are tapered, and to prevent sticking the cavities are preferably black leaded.

As already mentioned, greatly improved results are obtained, and much wear and tear of the dies prevented, if after heating the blank and before it is upset in the dies it is subjected to a straightening operation and rendered as perfectly straight as possible, instead of relying upon the dies themselves to remove the bends and irregularities which are necessarily produced during the heating of the blank in the furnace. Furthermore, by this step the scale gathered in the heating furnace is removed, and the rolled blank is made exactly true in diameter and perfectly round, delivering the axle blank in an ideal condition to the dies. To conform to the contraction of the steel in cooling off, the cavities of the die correspond to the size of the axle in the hot state. The displacement of the punches is about 1 cubic inch greater than the difference between the cubic contents of the cavities and the blank, owing to the compression of the metal. See Fig. 1.

FIG. 10.—ETCHED SPECIMEN FROM JOURNAL OF SOLID FORGED AXLE.

FIG. 11.—ETCHED SPECIMEN FROM CENTER OF HOLLOW PRESSED AXLE.

### Output of Forging Press.

In order to cover all possible conditions and emergencies in the manufacture of these car axles the press should be designed for about 350 to 400 tons, total pressure being about 1,500 pounds hydraulic pressure per square inch. To lengthen the life of the punches and avoid liability to their injury by the heat, the piercing should be carried out very rapidly. This can be accomplished in four to five seconds by connecting the hydraulic cylinders and the accumulator with a correspondingly large pipe line and by using specially designed four-way operating valves. The auxiliary parts of the press require for their operation a hydraulic pressure of 500 pounds per square inch. The quantity of water needed is comparatively small. One 22x36⅜x5¾x36 inch high pressure pump and one 22x36⅜x10x36 inch low pressure pump, requiring a total of about 200 horsepower, are sufficient to serve four presses, aggregating the punching of 1,200 axles in 20 hours.

With the experimental plant erected in Homestead, the time

required to make one axle, all operations included, did not exceed two minutes. Allowing, again, two minutes for cleaning and black leading the dies and for cooling and capping the punches, the capacity of one press will be 15 axles per hour, or 300 axles, 5½x10 inch journal, per 20 hours, which is fully three times the quantity accomplished with one hammer by the best American practice. The number of men required to operate the press remains the same as needed at the hammer to forge five 5½x10 inch journal axles per hour. The machine above described has many advantages. It is effective in construction and produces a strong and light axle which contains the cardinal combination desired—namely, minimum weight and maximum strength.

Axles made as above set forth have more resiliency than the present type, and are not, therefore, liable to fracture from sudden strains. Their use in railroad car construction results directly in material economy, not only over solid axles, but over any other species of hollow axles known to the writer.

Broadly speaking, hollow axles are old, but such axles have been made either by casting them the shape desired or pressing them hollow throughout and then forging on a mandrel or by boring out solid metal. These methods are each objectionable, because they either fail to produce axles of sufficient strength and lightness or are too expensive for general adoption. The end portions of this axle are, of course, hollow, the cavities extending beyond the wheel seat, but this is an advantage because the forging action which is produced by the entrance of the punches greatly compacts and strengthens the metal and renders the axle less liable to break. The combination of hollow ends with solid center has the advantage over hollow axles that all requirements for the drop tests and for torsion, produced in curves, are fully covered. It is obvious that a hollow axle will soon deform in the center under the drop test, rendering the test uncertain.

Regarding the change from a hollow to a solid section, it is important to have the section increased uniformly, avoiding any sudden changes, and accordingly the point of the punch is made to conform to the curve of a parabola. In actual practice the solid axle usually breaks or becomes fractured at the juncture point of the journal with the wheel seat or in the body back of the wheel seat, owing generally to segregation and piping, or to detailed fracture. By the new process of manufacture this is believed, and has been proven from experiments, to be entirely prevented. The metal is effectively worked from the center of the axle and from the ends of the journals.

The greater stiffness and strength of the hollow pressed axle were demonstrated, not only by the drop tests, but furthermore confirmed by the following loading test: A Carnegie ore car having one truck fitted up with solid standard axles, the other truck with hollow pressed axles, was loaded with 96,500 pounds of limestone, the gross weight of the car being 131,600 pounds. The difference of the deflections measured with the instrument in the center of the axles for the loaded and the empty car was 1-128 inch for the hollow pressed and 1-32 inch for the solid standard axles, showing a greater deflection of 3-128 inch for the solid axles. To minimize this bending is of course of the greatest importance for the durability of the axles. When the car is in motion its effects produce a continuous change of strain in the different parts of the axle, the lower half being in compression, the upper half in tension, causing eventually detail fracture, and consequently the smaller the deflection the greater the durability of the axle, the reduction of the deflection being proportional to the square of the life of the axle.

### Smooth Forged and Rough Turned Axles.

It will be understood that heretofore, in the finishing of an axle, it has been greatly weakened by cutting away the outer skin, which has been compacted by the forging operation; but in the use of the present system a tough dense skin is produced on the interior of the axle by the forging action of the punches, and this skin is not cut away, but remains a permanent element of strength, and the tough external skin is cut away only at the end portions. It is unnecessary, as heretofore, to machine the axle throughout its entire length, for by the dies it is compressed to exact length and made so true that it is sufficient if only the journals and wheel seat portions are turned or machined.

Tests made last year by the Howard Axle Works and the Altoona shops of the Pennsylvania Railroad Co. upon 24 5½x10 inch journal axles to determine the relative strength of smooth forged and rough turned axles, employing tensile and drop tests for this purpose gave the following average results of the drop test:

| Heat number. | 13,008 | 21,719 | 12,768 | Average. |
|---|---|---|---|---|
| Smooth forged..... | 61 | 30 | 34 | 46 |
| Rough turned ..... | 43 | 32 | 32 | 39 |

| | Smooth forged | | | Rough turned | | |
|---|---|---|---|---|---|---|
| Heat No. | Carbon. | Tensile strength. Pounds per sq. inch. | Elongation. Per ct. | Carbon. | Tensile strength. Pounds per sq. inch. | Elongation. Per ct. |
| 13,008 ..... | 38.0 | 63,632 | 22.4 | 38.9 | 63,648 | 22.3 |
| 21,719 ..... | 44.5 | 71,307 | 21.0 | 44.8 | 70,446 | 21.0 |
| 12,768 ..... | 48.9 | 78,232 | 17.3 | 50.2 | 77,811 | 17.8 |

It was noticeable that all the smooth forged axles developed quite extensive longitudinal seams before failure, and that these appeared to have no influence whatever on the results, some of these having the most pronounced seams standing the best tests; also, just before failure, the turned axle developed cracks which followed the tool marks, indicating clearly that these had weakened them. Neither the variations in finishing temperature nor the amount of material removed from the turned axles appeared to have any influence on the results. From this it appears that the smooth forged axles are stronger than the rough turned, and that the difference is the more marked the lower the carbon.

### Steel Specifications.

Regarding the quality of the steel, ordinary axle steel specifications are sufficient. The requirements are that the blank be free from seams, the diameter of the rounds be within 1-32 inch of that specified, and in the length of the blank a variation of ¼ to ⅜ inch is permissible. Providing the mill round is not true, which variation in ordinary practice usually varies 1-16 to ⅛ inch, the blank in passing through the cross rolls is reduced to a perfect circle, and the excess material, elongating the blank over the normal length, must be taken care of in the press. For this purpose one end of the dies forming the end collar on the axle is turned out sufficiently large to provide a receptacle for the flow of this excess length, thus permitting the punches to enter the axle to a uniform depth, thereby insuring at all times a uniform axle, conforming exactly to the form of the dies. The excess diameter of the collar is readily reduced to requirements in the lathe. Of course seamy steel will produce cracks upon the surface of the axle, due to the expanding action of the punch. This fact is very important, as it prevents the making of a defective axle without being detected, makes rough turning over all to show up defects unnecessary, and even the drop tests may, in time, be discarded and only surface inspection be required, because a hollow pressed axle without any cracks furnished the best proof to the railroad companies of receiving an axle of the very best quality.

### Advantages of Hollow Pressed Axles.

The advantages of a hollow pressed axle may be summarized as follows:

1. The axle has a perfect form; its shape can be best adapted to resist the strain to which it is subjected with the least amount of metal, combining minimum weight with maximum strength.

2. The forging effect being carried out throughout the material, both internally and externally, the material is found to be far more homogeneous than solid axles made in the usual manner, segregation is destroyed and, consequently, the axle is much more reliable.

3. The journals, being highly compressed, will in finishing attain a more highly polished surface, thereby minimizing the friction, resulting in economy of draft.

4. The journals, being hollow, will remain cooler and permit the storage of a considerable quantity of oil, removing herewith the chief cause of hot journals, also economizing materially in the expenditure for lubrication.

5. No straightening after punching is required, the axle being as straight as the die, thereby eliminating entirely the injurious effects of the gagging operation.

6. No centering, no cutting of the ends, no rough turning is required, thereby saving consideraoly in finishing labor and

increasing the finishing capacity of existing plants.

7. The punching of treble the amount of axles as compared with forging with an equal number of hands, resulting in saving of forging labor.

8. Considerable saving in steam consumption and fuel.

9. The detection of a defective axle without performing any extra work—that is, without the necessity of rough turning it over all, which provision is now included in the latest M. C. B. specifications.

10. Approximately uniform fiber stresses throughout the body of the axle, due to the straight and uniform taper between the wheel seats.

11. A saving of 33 percent of steel in the manufacture.

12. Present drop test specifications need not be changed.

13. The possibility of supplying uniform axles, limiting the weights and dimensions to a minimum.

14. The weight of a 100,000 pounds capacity steel car is decreased by 1.7 percent, permitting this load, which amounts to 24,000 pounds in a train of 40 steel cars, to be carried without any additional expenditure of energy. Converting this advantage into other channels, there would be a corresponding saving in coal consumption or tractive power.

The system is, of course, easily adaptable for the smaller sizes of axles, with a corresponding decrease in the cost of installation.

At the Düsseldorf Exhibition last year a very fine display of shafting and axles was made by the aggressive companies in Germany. The greatest number of these axles were bored throughout the entire length, having a hole about 1½ inches in diameter. The fact that manufacturers resort to this expensive drilling, not only in axles, but in all shafting, such as crank shafts for large engines and propeller shafts, shows that the elimination of the injurious effects of segregation is absolutely essential to produce a safe and reliable shafting.

In punching these axles, by the pressure applied the protecting caps are welded to the axle blank, and therefore it may be safely concluded that any cracks which may be caused by the primary work in the solid part of the axle will be eliminated by the action of the punches.

## TRADE PUBLICATIONS.

The story of the stoker made by the Wilkinson Mfg. Co., Bridgeport, Pa., is well told in one of their recent publications. The story is illustrated with many half-tones, including a portrait of the inventor of the stoker. There is also a large selection of complimentary testimonials.

Some samples of "Marvel" tracing cloth, the "Linaura" special linen fabric for blue printing, section lined sketch paper have been received from Williams, Brown & Earle, of Philadelphia. The linen fabric for blue printing has the useful quality of being readily cleansed and will dry perfectly flat.

A catalogue covering hoisting and hauling engines, ventilating fans and acid proof pumps is sent out by Crawford & McCrimmon Co., of Brazil, Ind. The catalogue is well illustrated. Most of the pages have interesting foot notes which are not invariably of the copy-book order, and perhaps it was not entirely by accident that page 10, which says "Give the devil his dues," is followed on the next page by the words, "Time flies; order early."

A circular has been received from the St. Louis Machine Tool Co., describing the St. Louis tapping machine No. 4 and No. 6. The St. Louis reversing tapping chuck is also shown. The operation of this device is quite simple. The drill press is fed down in the ordinary manner until the desired depth is reached and then the chuck is reversed by returning the drill press spindle. The chuck may be thrown out of gear when the tap reaches the required depth by setting the stop collar on the drill spindle one-quarter of an inch higher than depth of hole when the tap is resting on the surface of the work. Tapping machines for bench and column service are also shown.

We have received a mailing card showing the plain salb milling machine manufactured by the Keystone Machine Tool Works, of Philadelphia. A cut of the universal cold saw cutting-off machine is also given, and there is a list of the different machines manufactured by this company.

Coal-handling machinery is described with the aid of a number of small but clear illustrations in pamphlet No. 033, prepared by the C. W. Hunt Co., Staten Island, New York. The firm makes all classes of coal-handling machinery from the simple mast and gaff fittings to the steel tower.

The second-hand department of the Garvin Machine Co., of New York, receives some attention in a recent booklet. Machine shop equipment of various kinds and from many firms is briefly enumerated.

The Van Dorn Iron Works Co., of Cleveland, has just issued a general catalogue No. 55 calling attention to some of its special lines. Among these is shown an equipment of conveying appliances for the National Castings Co., of Cleveland. Steel document cases, fire escapes, steel structures and cranes are noted among the numerous lists of products.

"How to pack gas engine cylinder heads," is an interesting leaflet, giving full directions for cutting gaskets, preparing the flange and applying the gasket, so that the most efficient service may be obtained. The difficulty of packing cylinder heads for gas engines for stationary, launch or motor service, has been one of the discouraging features in the use of these engines. Anyone interested can secure this leaflet from the H. W. Johns-Manville Co., New York, or their branch offices.

Several circulars directing attention to the product of the Abendroth & Root Mfg. Co., of New York, have just been issued. These relate to water tube spiral riveted pipe, exhaust heads, Furman boilers, etc.

Circular No. 2 of the Mueller Machine Tool Co., of Cincinnati, relates to the plain radial drill recently described in *The Iron Trade Review*. This machine is also made to be driven by a constant speed motor or plain pulleys instead of cones. By using plain pulleys the machine can be driven at right angles to the line shaft or from below the floor.

The Youngstown Iron Sheet & Tube Co., Youngstown, O., has a price list of galvanized sheets. The cover of the circular is adorned with a view in colors of the sheet mills.

The N. & G. Taylor Co., manufacturers of tin plate, Philadelphia, are sending out sample copies of a booklet which will appear monthly as a house organ. No. 1, of volume 1, is a decidedly attractive effort and will doubtless continue to vigorously push the cause of good tin roofs.

Bulletin No. 13 treats of the traveling cranes manufactured by Pawling & Harnischfeger, of Milwaukee, Wis. The illustrations have been well selected to show the varied utility of these hoists and there is a partial list of companies using this line of apparatus.

The Star Dynamo Co., of Jefferson City, Mo., has superseded the four previous catalogues by a recent pamphlet on direct current dynamos and motors from ½ to 7½ k. w. The different types are illustrated and among the number is a momentum disc machine designed for a gas engine drive.

A catalogue of 100 pages is devoted to the modern labor-saving appliances manufactured by F. W. Braun Co., of Los Angeles, Cal., for assayers and chemists.

The Manville Brothers Co., of Waterbury, Conn., has a folder on the "Yankee" bench press. This machine is designed to take the place of the ordinary foot and screw press. The press has a combination stop clutch which renders feeding by hand practically safe.

A short story of John Stevens and his sons is treated appreciatively in the latest number in the series of booklets produced by Wyman & Gordon, manufacturers of drop forgings, Worcester, Mass.

The catalogues of the Garvin Machine Co., of New York, are being revised and the following are at hand: "A Modern Machine Shop Outfit," "2x12 Universal Screw Machine," "Plain Milling Machines," and "Universal Milling Machines." These are freely illustrated but the pamphlets are only intended to suggest the large and varied assortment of machine tools manufactured by the company.

"Turbine Water Wheels" is the title of a circular on hydraulic machinery made by the Webster, Camp & Lane Co., of Akron, O. The illustrations show the penstock unit designed and built by the firm for the 50,000-horsepower plant of the Michigan Lake Superior Power Co. at the "Soo." There are now in place 42 of these units consisting of 168 turbines. A noteworthy account of the tests of these latest designs in turbine equipment is submitted and copies of the complete data will be furnished on application.

# Some New Things for the Shop, Chiefly by Way of the Patent Office.

## Machine Tool Construction.

Something of a wrinkle in machine tool design has recently received the protection of a patent granted William Sellers, of the well known firm of William Sellers & Co., of Philadelphia. The invention relates more particularly to that class of machine tools in which the cutting tool is carried by a slide rest supported by uprights or housings attached to a bed, the work being reciprocated or rotated between these uprights as in the case of planers and boring and turning mills. The ordinary design for this class of machines has the crosshead or crossrail, which forms a part of the slide rest, secured against

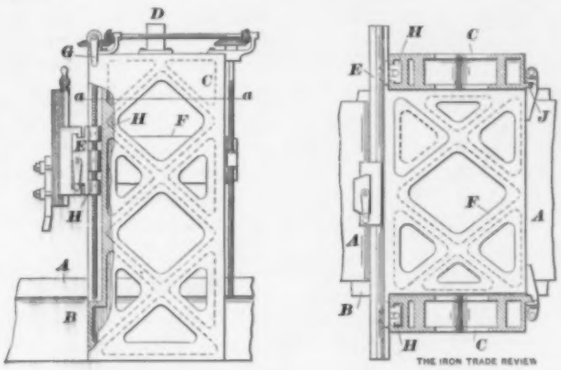



*Fig. 1* *Fig. 2*

A WRINKLE IN MACHINE-TOOL DESIGN.

the face of the housings and on these it may be raised or lowered to suit the work in hand. The tool post or carrier is movable at right angles to the crossrail, the cutting tool projecting below the crossrail and in large machines it is often required to project very far below. The inventor points out that a tool so supported must cause a considerable torsional strain in the crossrail and in large machines where the distance between the uprights is great, the distance below the crossrail at which the cutting tool can work efficiently is comparatively small because the crossrail section at the housings cannot be increased without introducing other elements of disturbance equally injurious. Aside from this condition, the crossrail is only bolted against the face of the housings so that it becomes a brace between the two uprights to support the lateral strains within the limits of friction only.

The designer has had the following objects in view: A form of crossrail which shall resist these torsional strains without transmitting them through that section which is bolted to the face of the housings; a means of bolting the improved crossrail between the uprights as well as to the face of the housings; to provide in addition to the plane surface on the face of the uprights, plane surfaces between the housings to which the crossrail may be bolted so that the rail may be raised or lowered in a vertical line and properly secured; means for raising and lowering the crossrail between the guiding surfaces without disturbing its parallelism to the table supporting the work. How far this extensive undertaking has been realized may be seen by close examination of the engravings. Fig. 1 shows a side elevation of the new machine tool with a portion in section. Fig. 2 is a sectional plan view on the line a-a of Fig. 1. A is the table of the machine upon which the work is secured. This table is reciprocated, as in a planer, or rotated as in a boring and turning mill, upon the bed B to which are secured the housings C, the latter being secured at the top by the crossbeam D. The crossrail E F is composed of the beam E which extends across the face of the housings C, and a crossbeam F which is in one piece with E and extends backward between the uprights. The crossrail is of course securely clamped to the front and rear of the housings before machining the work secured upon the table A below it.

The crossrail E F is suspended by four screws in order to make the vertical adjustment, one of these screws is in each front face and one on each rear face of the two housings C. The screws in the front face of the housings are suspended from stands fastened to the top of the uprights so that the screws will pass behind the crossrail E and to this end these screws are sunk into recesses in the face of the housings as shown by the part in section in Fig. 1. The other two screws are also suspended from stands on the top of the housings and extend along the rear face of the uprights as illustrated at the right of Fig. 1. All four of these screws are rotated in unison by bevel gears of the same diameter and the four screws are thus turned at a uniform velocity by the crank arm G. Clamps H are mounted above and below the nuts on the front screws and there are clamps to grip the stand supporting the nuts firmly against the side of the ribs J which extend from top to bottom of the rear vertical faces of the housings. By this means the crossrail may be raised or lowered and clamped against the face of the uprights and between them so as to resist strains in every direction.

The patentee recognizes the fact that in many cases it may not be advisable to extend the crossrail as far back as to the rear face of the uprights and therefore does not limit himself to the use of a crossrail extending the full depth of the housings.

## Increasing the Grip of a Friction Clutch.

The *Mechanical Engineer* has a sectional view of a friction clutch recently designed and patented by Prof. H. S. Hele-Shaw, of University College, Liverpool. This is shown in the accompanying illustrations, in which Fig. 1 is a longitudinal section, Fig. 2 a transverse section, Fig. 3 a sectional view of the friction discs, Fig. 4 a view of one of the driving discs, and Fig. 5 a similar view of a driven disc.

On the end of the driving shaft A is keyed a sleeve B, on the outer surface of which a number of key-ways are formed. On the adjacent edge of the follower shaft C is keyed a sleeve D, which is prolonged and enlarged so as to extend over the driving sleeve B. The bore, in which a number of key-ways are similarly formed, being considerably larger than the diameter of the driving sleeve B. The annular space so formed between the sleeves B and D is closed by an annular cap E screwed into the end of the follower sleeve, and fitting on the driving sleeve so as to permit of relative rotary motion between the sleeve B and the cap. Into this space is packed a large number of sheet metal discs, a few only of which are

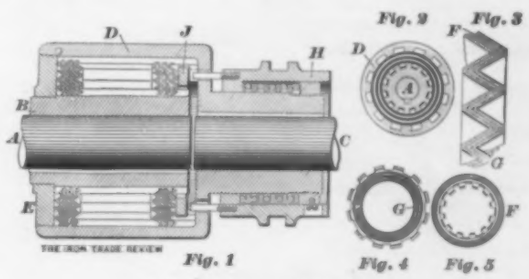



*Fig. 1* *Fig. 4* *Fig. 5*

*Fig. 2* *Fig. 3*

A NOVEL FRICTION CLUTCH.

shown for the sake of clearness. These discs are each deeply corrugated so as to comprise a number of conical frusta pointing alternately in opposite directions. The discs are grouped into two sets F and G, the set F (Fig. 5) being made with internal projections to engage with the keyways of the sleeve B, their peripheries being clear of the casing D; the other set G (Fig. 4) are similarly keyed by their external tongues to the casing D and clear the sleeve B. The discs are formed of sheet metal, being sufficiently thin to be punched or sheared from the sheet at one operation, and are deeply corrugated by being pressed between a pair of positive and negative dies. Several important advantages result from the formation of the

discs out of sheet metal as described. The cost is only a small fraction of that of machined discs; they are much thinner than would be practicable if they were machined, and this permits a very large number to be fitted in a clutch of moderate length, and as the engaging pressure required varies inversely as the number of meshing surfaces, only a comparatively small engaging pressure is required.

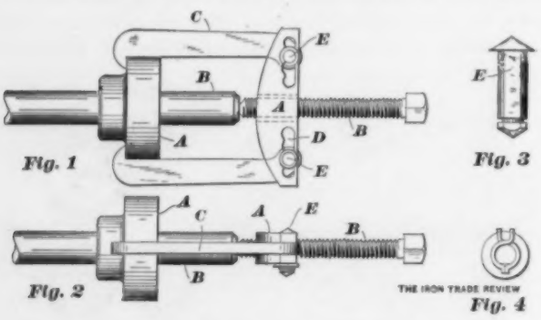
In order to give the pressure to cause engagement there is mounted on the follower sleeve D, a sliding spring box H with an internal spring. This box H is urged to the left by the spring which abuts against the collar and it is controlled by a forked lever engaging in the groove. The thrust of the box H is transmitted by a number of pins to the annular plate J bearing against the first disc of the series. When the spring box H is left uncontrolled, the shafts are engaged by frictional contact of the discs due to the pressure of the spring transmitted through the box H, the pins and the end plate J, and there is then no external reaction and very little friction between the controlling fork and the groove. To disengage: the spring box is forced to the right by the controlling lever, relieving the engaging friction. There is then pressure between the controlling fork and the groove, and external reaction, but as the follower shaft is then at rest there is no friction. The gripping power of the clutch being very great, it acts quite efficiently even when the friction surfaces are well lubricated.

It will be seen that the device described permits of the use of conical surfaces of a large area and very acute angles, without the extreme length which would be required if each of the frictional surfaces were made in the form of a single conical frustum; moreover, discs of the form described are much stiffer and better adapted to transmit the torque than simple conical frusta would be.

## A Coupling Press or Stripper.

The fastening of machine parts together by forcing the one part on the other is as common as the use of machinery and at first thought it is not very evident how anything of a more simple character than the familiar screw, cross-bars and links can be devised. Obviously the combination can be arranged in various ways but how far these variations can be considered invention is a matter of opinion. The Patent Office has, however, set the seal of approval on the screw press which has been invented by Newton Crane, of Boston.

The appliance is so constructed as to be capable of adjustment so that it may be employed for removing wheels, cams or other parts of various diameters. The invention consists of three essentials; means for engaging the part to be removed, "a nut to which the means are attached and a screw passing



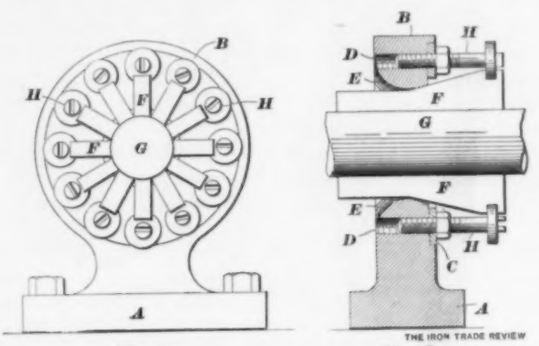

A SHAFT STRIPPER.

through said nut and adapted to engage the end of the shaft on which the said part is located."

A shaft is shown in Fig. 1 with the stripper in position for the removal of the collar A. Fig. 2 is an edge view of Fig. 1. The tool comprises the nut A, the screw B and the swinging arms C. The inventor informs those who are familiar with the art to which the improvement relates that "the screw B is provided at its end with a head of wrench-retaining formation by which it may be rotated and caused to move longitudinally through the nut A." The nut A has two pairs of wings or lugs fitted to receive the ends of the links C. These lugs are slotted as at D, one side of each slot being straight, and the other being provided with a series of rounded notches. These notches fit the pins E which hold the links C in position. An elevation of one of the pins E is shown at Fig. 3 and it will be seen that one side of the pin is flattened to fit against the straight side of the slot D, the rounded side fitting in one of the notches. The pin has a head at one end and at the other is a groove for the reception of a spring catch and washer. The spring catch and washer may be made as illustrated in Fig. 4, the spring catch being of wire bent to provide the two projecting ends which when pressed together will separate the two limbs of the wire and lift them out of the groove in the pin. The spring catch is attached to the washer in any suitable way and the pointed end of the pin shown in Fig. 3 enables the two to be readily snapped together. The use of the device is obvious.

## A Peculiar Shaft-Bearing.

Forms of sectional bearings for shafting are not uncommon in practice. The Straight Line engine, for instance, has afforded some interesting examples of the ingenuity of Prof. Sweet in this direction. The main peculiarity of the one selected for illustration is in the method of adjustment and the consequent complication. The device was probably designed for some




A SECTIONAL BEARING.

special purpose where the number of parts may not be so detrimental in view of the object sought. Be that as it may—and the possibility is slender enough—the peculiarities of the bearing invented by William L. Webster, of New York, may be noted by an inspection of Figs. 1 and 2. The former being an end elevation of a solid bearing box showing the ends of sectional wedges, ends of adjusting screws and shaft; the latter view, Fig. 2, being a vertical section through the axis of the shaft shown in Fig. 1, the broken shaft being seen in elevation.

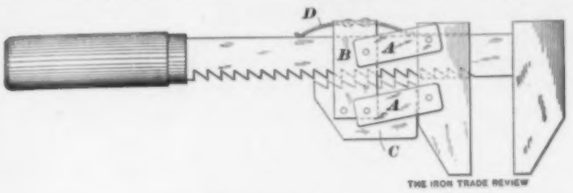
The base of a bearing block is indicated at A, and B is the upper part, the two being represented as made of the one piece of metal. The upper part B may, however, be made separate from A and then the cap (B) would be bolted to the base in the usual manner, this construction being advisable where the shaft cannot be conveniently entered lengthwise into the bearing. There is a recess C extending around the opening E and there are a number of tapped holes D arranged in a circle about the shaft passage E. The inner edge of the shaft passage is coned and curved as shown in Fig. 2.

The bearing proper is formed on the inner edges of a number of wedges or bearing sections F, the inner edges being concaved out to fit the shaft. The outer edges of these wedges F rest against the inner rounded surface of the opening E. A circular plate rests in the recess C of the bearing block and this plate has projections which properly hold and space the bearing wedges F. Screws H pass through the circular plate into the tapped holes D and are locked by means of check nuts. A flange on the end of each screw enters a notch in a wedge which is in alignment and thus can be adjusted lengthwise and consequently will take up wear on that section of the bearing by reason of the incline on the back of the wedge. The sections can be adjusted generally to take up wear or they can be separately adjusted to rectify the centering or alignment of the shaft.

The bearing of the wedges against the coned surface E allows the sections to freely assume a position in line with the shaft so that the bearing is practically self-aligning.

## Speeding Up the Monkey Wrench.

The single handed operation of the money wrench is an everyday action, the thumb working the adjusting screw with ease in setting up or slacking back the jaws when making a change in the size of grip. Little time is required for the adjustment, but the average inventor looks with envious eyes upon that minor waste and occasional efforts to speed up the monkey wrench filter through the Patent Office sieve. The engraving shows a typical addition to the stock. The movable jaw has pivoted on each side a pair of links or straps A which are similarly connected at their opposite ends to the yoke B




A NEW MONKEY WRENCH.

which is substantially of U-shape. This yoke B straddles and is fastened to the toothed block C. The yoke has a bow spring D riveted to the back, the curved ends of the spring resting upon the back of the wrench shank.

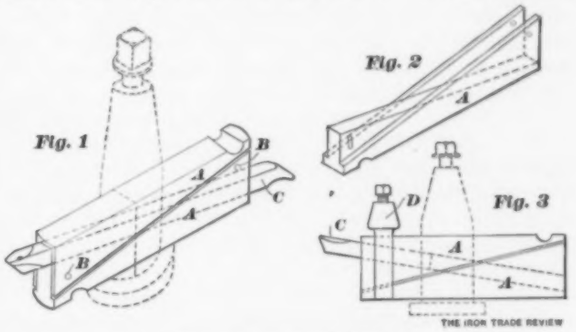
The teeth on the shank of the wrench are inclined to conform to the angle given to the teeth on the locking block C so the two will easily slide over each other in the one direction; namely to bring the jaws nearer to one another. The spring D normally tends to hold the locking block C engaged with the shank but when it is necessary to move back the jaw toward the handle then pressure is applied to the back of the yoke B as in the illustration. As soon as the pressure on the yoke is relieved, the spring engages the teeth in the block and the shank and the jaws are then securely held in the desired position.

Unless the teeth are small and correspondingly weak, the adjustment of the jaws must be somewhat of a compromise as it is not capable of the nicety of setting possible with the screw actuated wrench. The inevitable looseness at the jaws will be apt, in consequence, to cause them to fit more on the corners than the sides of nuts, etc. But refinements of this kind will not appeal to the type of workman who has most desire for quick acting, even if coarse fitting, monkey wrenches.

The wrench described is the subject of a recent patent granted to Jacob Hoffman, of Turtlecreek, Pa.

## A Toolholder.

A toolholder has been patented by Daniel E. Norris, of Tiona, Pa., and is illustrated in Figs. 1, 2 and 3. Fig. 1 shows a toolholder in place in the tool-post, the latter indicated by dotted lines. Fig. 2 is one of the parts of the toolholder and




DETAILS OF TOOLHOLDER.

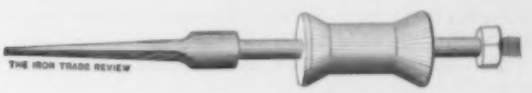
Fig. 3 is a side view of the toolholder provided with an auxiliary clamp.

The holder is formed of two duplicate parts A. Each part is made with a groove or channel as a carrier for the tool at one end and at the other end is a tenon or pressure piece as best shown in Fig. 2. The sides of the channel or groove extend beyond the outer surface of the tool C and are provided with perforations. The pressure piece or tenon is provided with a small slot and when the parts are assembled the perforations register with the slots. The pins B are secured in the perforations and with the toolholder thus assembled there is a continuous opening through it at a slight elevation. The two parts being made in duplicate the cost of manufacture is materially reduced. The pin and slots at the ends form a loose connection which permits the parts to be sufficiently separated for the removal or insertion of the tool, etc.

The clamp D is used to enable the holder to handle short lengths of tool steel or to strengthen the holder when required by heavy work. The clamp or strap is rounded to fit in a groove in the holder and the upper part has a stout head and setscrew. The bearing surface of the clamp is rounded and readily adapts itself to the holder.

## Combination Drill Drift and Hammer.

The convenience of the taper shank drive is no more appreciated on drill presses than it is on millers and other machines but in the train of such advantages comes the necessary nuisance of the drift key. The drift is usually chained to the machine but that is not enough as after the insertion of




A DRIFT AND HAMMER.

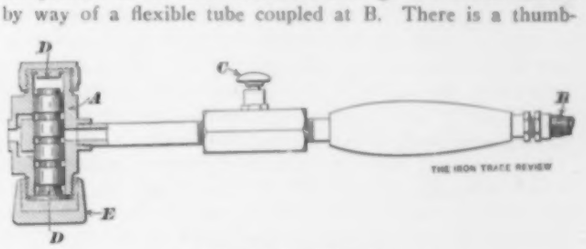
the drift into the slot there must be the persuading influence of a hammer, a wrench, a chunk of iron, or any old thing of weight to force the parts asunder. Anything of sufficient weight will do, but this is not so conveniently attached to the machine as is the drift and there is always the danger of pounding the right object with the wrong thing. A hammer is preferable for obvious reasons and the designer of the tool illustrated has wedded the drift and hammer together in effective fashion.

The drift key is forged and the shank threaded and forced into a tapped hole so that the former may be removed and turned over to the tool dresser for treatment when this is required. The shank is long enough to let the spool-shaped weight or hammer slide a sufficient distance to bump lustily on the end of the key. The shank has a hole in the outer end, outside of the nut, so that a chain may be attached and tool chained to some convenient location.

The length of tool is fifteen inches, the weight is 2¼ inches at largest diameter. Weight four pounds. This drift is manufactured by the Maria Stein Machine Works, of Maria Stein, O.

## A Vibrating Hammer.

The Patent Office specification so describes the tool shown in the engraving but most mechanics understand any hammer to be of the swinging type. There is an obvious distinction, nevertheless, which gives ground for the present classification. The head A contains a flanged piston which is reciprocated by compressed air or steam admitted through the hollow handle by way of a flexible tube coupled at B. There is a thumb-




A HAMMER INNOVATION.

operated valve at C which regulates the admission of air or steam as the case may be. The ends of the hammer head are capped and between the caps and the piston are interposed anvils as at D.

The invention has been found servicable in metal founding where it is necessary to jar or vibrate the pattern as the latter is drawn from the mold. At the same time the tool may be employed as an ordinary molder's hammer for striking a heavy blow to loosen the pattern with or without employing the vibrator. For this purpose the one end or the other of the hammer head is provided with a rubber cushion E so that a swinging blow on the pattern will be less likely to injure it.

The elastic face of the rubber has a better effect in loosening the pattern from the mold.

The inventor shows modifications of the tool as, for instance, one face of the hammer head is concaved and provided with a groove so that the tool may be more readily held against the pattern stem. The opposite face may be equipped with means for holding tools, as for example a screw socket or jaws.

It is interesting to learn that the tool has been found of value for massage purposes on the same principle doubtless that it may come in useful for jarring the scale off boiler tubes, etc. The patentee says in regard to the massage matter: "The user not only has the curative effects of the rapid percussions, but may also employ a swinging blow when heavier and less rapid strokes are desired. For the purpose last described it is of course desirable that the hammer itself be light in construction and design and plated or otherwise made of pleasing appearance." But there seems to be no very obvious reason why the tool should not be of pleasing appearance when made for a molder. Appearances count for something in the shop of course.

This vibrating hammer is the invention of Herbert M. Baldwin, of New York.

### A Drill Chuck with an Extra Grip.

The small drill chuck becomes less of a convenience as it approaches the limit of its capacity. Then it becomes weaker and losing hold at a critical juncture does little more than chew off the figures on the drill shank, the aforesaid figures being for some reason usually placed where the chuck jaws will in the natural course of events soon render them illegible. The

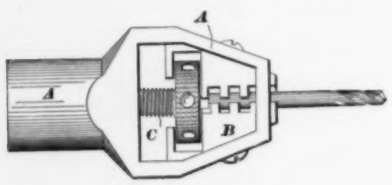



Fig. 1

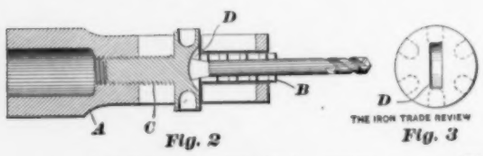



Fig. 2 Fig. 3

A SELF-TIGHTENING DRILL CHUCK.

well known weakness of small chucks causes them to get a lavish amount of harsh persuasion; a coarse grip from a pipe wrench or a hasty blow from a hammer has put many a one out of commisison. H. M. Reynolds, of Oneida, N. Y., has taken out a patent on a form of chuck with a bulldog sort of grip, or as the inventor states, "effective means for automatically reinforcing the grip of the drill holding jaws proportionately to the degree of torsional strain exerted on the drill." The present invention is in the line of an improvement on the chuck patented by Mr. Reynolds in 1899.

A side view of the recently invented chuck is shown in Fig. 1 and a longitudinal section at right angles to Fig. 1 is illustrated in Fig. 2. The skeleton body of the chuck is indicated at A, the chuck jaws being shown at B. The chuck jaws B have lips which engage the back of the head of the screw C, the latter being threaded to fit a tapped hole in the chuck body A. By turning the screw head the chuck jaws B are moved to right or left as the case may require and thus grip or loosen the drill. A face view of the screw head of C is shown in Fig. 3 and there is a transverse slot D which gets a screwdriver grip on the tongue-shaped end of the drill as best illustrated in Fig. 2. It will be seen that the torsional strain exerted on the drill when drilling a hole, tightens up the left-handed screw C which consequently increases the grip of the jaws on the drill.

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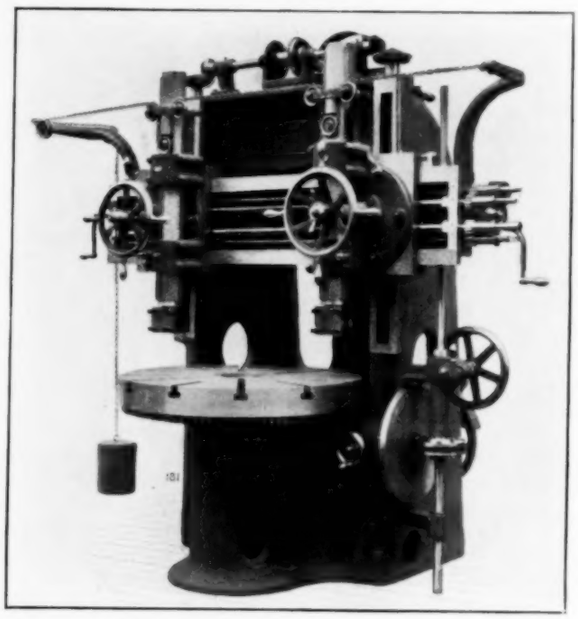
The Sebring Forge Works, Alliance, O., expects to begin operations this week.

### BORING AND TURNING MILL.

A 37-inch boring and turning mill has been brought out by the American Tool Works Co., of Cincinnati. As will be seen by the illustration, the entire frame is cast in one piece comprising the bed, housings, and top brace. The casting is of box form and thoroughly braced for exceptional strength and rigidity. The cross rail is of the box girder type with broad bearings and may be rapidly raised and lowered by power. The saddles are graduated in degrees and are made right and left, so that the boring bars can be brought close together when desired. The boring bars are of special hammered steel, octagonal in section, and the racks by which they are operated are in one piece with the bar. They are perfectly counterbalanced and can be fed entirely independent of each other at any angle.

The table is 36 inches in diameter, is powerfully geared



37-INCH BORING AND TURNING MILL.

and has 16 changes of speed. The teeth on both table and pinion gearing are accurately planed from the solid. The table spindle is of large diameter and extra length, and the thrust is taken on hardened and ground steel collars. The feed is operated by a friction disc having rapid adjustment by rack and pinion, seen at the right of the illustration, the combination givng a range of feed from 0 to 5-16 inch, vertical, and 0 to 5-16 inch, horizontal, per each revolution of table.

The driving cone has four steps, the largest of these being 18 inches in diameter and taking a 3-inch belt. The driving mechanism is located at the back of the machine, thus avoiding liability to accident when work is being put in position or removed from the machine. The machine is self-contained and thus obviates the necessity of an expensive foundation.

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The Harrisburg Foundry & Machine Works, Harrisburg, Pa., has received an order in which it takes much pride; it being from the United States Government for one of the latest patter standard compound engines manufactured by the Harrisburg concern. The machine wil be a model one, and will be used in the National Bureau of Standards.

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Concerning the report that the Northern Coal & Coke Co., which has recently acquired a large acreage of coal and timber lands in eastern Kentucky, will build several thousand coke ovens this year, we are informed by one of the stockholders that it is not probable that any coke ovens will be built this year.

# The Labor Department in Metal Working Industries.

BY JULIAN V. WRIGHT.

The idea of the labor department in shop organization has been proposed within the last years by several independent people, all more or less directly concerned with the labor question. It would seem that there must be some unfilled place in industrial work, the existence of which is now being realized, and the remedy for which calls for work, or rather results, such as might be expected from a labor department. It is also worthy of remark that while several of the proposals made publicly for the establishment of such a department were vague and merely conveyed the general idea of the department, three of them were specific enough to give considerable detail and in these cases the proposals covered practically the same ground.

So far as is known the first department of this kind created and forming an integral part of any manufacturing business is that which was started about a year ago at the National Cash Register Co.'s plant by the president of the company, Mr. J. H. Patterson. The idea originally contemplated merely an addition to the duties of one of the factory supervisors, who was also given the authority to call together for consultation, when desired, some of the more prominent company officers. It was found, however, that this plan of organization divided the responsibility, was cumbrous in operation and incapable of carrying out the idea of the department to such an extent as seemed desirable. The work was therefore specialized and a department created which was given authority over certain matters which is was felt were connected with the labor question. The plan of having a certain number of advisers to consult with has been retained in so far that only matters of apparently great importance are submitted to them. In this new form the department is now slightly over a year old, and since knowledge of its establishment has gone out, quite a number of inquiries have been received regarding its conduct as well as the result which has been obtained by it, in which there seems to exist a considerable general interest.

The fact that the department was established by this company before any suggestions regarding such a department were made by outside people is but another evidence of the advanced methods pursued by the National Cash Register Co., and its early realization of the necessity for such a department. The object of the labor department is not only to receive and adjust equitably any complaints coming from the men, but also to handle generally any matter affecting the relations with the factory employes or their organizations.

In considering the work of the department, it should be clearly understood at first that the original and general idea that a labor department is simply charged with the adjustment of complaints or settlements of controversies between the company and the employes is incorrect. That is not only the least but comparatively a very simple part of its duties. The department is charged with supervision over the employment department, and with practically complete control, not only of those matters which are generally known as labor matters pure and simple, but even of such correlated matters as hours of work, pay systems, and day and piece-work rates or rather conditions affecting labor and existing in any part of the plant.

General attention is also paid to the relation existing between the foreman and the men. Where any evidence appears of friction the foreman, and frequently some of the men, are called into the department and the matter taken up and investigated with the general idea of settling it equitably. It would not be understood that an equitable settlement of the matter here means, as is frequently the case in labor matters, a compromise. It is the endeavor of the department to avoid a compromise wherever possible and to positively support either one side or the other. It has been found that in this way there is a decided disinclination on the part of either party to adopt a point of view without feeling it to be correct.

To fill the opening very generally existing in manufacturing plants between the foremen and the rank and file is a primary duty of the labor department and very possibly also its greatest opportunity to make itself of value by a practical demonstration as to its intent. Because, first of all, before the department may be of real service to any manufacturer, it is necessary to get the confidence of its men and to restore or even to create the feeling of personal contact with, and trust in, those in authority, which exists naturally in the small shop, where the owner is often his own foreman.

Experience has shown that the mere knowledge of the labor department's standing ready to hear any workman who may bring to it a complaint or any feeling he may have or hardship, has had a very salutary effect in the relations of the foreman and the employes and has also produced a limitation of demands on the part of the men to such as have a fair basis and are presented in the most reasonable spirit.

A statement of the conditions prevailing at the National Cash Register Co. factory may be interesting and evidence the degree of success attending the department during the year past. The whole plant was unionized thoroughly in 1899 and 1900 and is now running in practically all 36 departments as a union shop. There are now represented some 11 internationals, connected with which and affiliated directly with the American Federation of Labor are some 24 different local unions. The number of union men in the factory is now nearly 3,000, out of a total of 4,100, the difference consisting of factory foremen and assistants, office employes, clerks, women, and men engaged in outside maintenance work. Men belonging to the same local are employed in different departments necessitating a shop committee of the local for each department, so that there are now over 40 shop committees. Of the work carried on in the shop, considerably more than 60 percent is piece work. The records show that the total number of piece-work prices in existence in the factory amounts at present to something over 26,000.

As will be very readily realized by any who have had experience with organized labor, the two conditions of a union shop and piece-work system of pay satisfactory to the men may be considered anomalous. The majority of the employes working at piece work, work under no limitation of output but under a limitation of earnings. Arrangements are now pending which look to the removal of these limitations and the making of agreements such as will permit the employes to earn larger amounts and also increase largely the output of practically all the machine departments.

With the object of establishing a uniform policy throughout the factory and controlling the question of piece-work prices and their effect on the labor situation, the labor department has a subsidiary branch a piece price committee of which the head of the labor department is the chairman. All new prices or changes in prices are submitted to this committee for investigation before taking effect and it has also the authority to order the investigation of old prices in any department.

As a prerequisite of effective work there is necessary the possession by the staff of the department of a most thorough knowledge of the actual rules of the union by-laws and constitutions. Ordinarily any foreman, or even the manufacturer, can be only superficially familiar, if indeed at all, with the actual provisions laid down in such documents, and in a union shop is at the mercy of any representations made to him by the officers or committees of the union during any negotiations. Familiarity with the actual substance of these rules and principles has enabled the department to avoid the consideration of many demands made as not being authorized or even allowed under the by-laws.

As to the results of the labor department's work, noth-

ing better can be said than to quote some remarks made by the president of one of the unions to the president of the company about Christmas time:

"As a representative of organized labor, in the past six months I have come in contact almost weekly with representatives of your company dealing with the men, and I can earnestly and sincerely say that our dealings with the company for the men have been altogether satisfactory. Nothing ever demonstrated to me more clearly the fact that the N. C. R. company wanted to deal fairly with labor, than the establishment of the labor bureau, which I believe was one grand step toward that end."

A specific example of the possible value of a labor department to the company itself may be instanced by a case which recently occurred in an Eastern shop conducted in accordance with the most modern ideas of sanitation, etc., and running non-union, where the premium system had been ordered adopted by the management and had been installed for nearly a year. In this shop a visitor, through some casual questions asked a foreman, developed the fact that the time limits had been changed several times to correspond with the newer records of performances. That this was done by the foreman in pure ignorance of the working of the system and through a desire to make a record of cheap work in his department is undoubted. And yet this absolute violation of the plan of the premium system and the intent of the management remained unknown to the controlling officials of the company.

No action more certain to create distrust of the manufacturer and ultimately to cause labor trouble could possibly have been deliberately devised by the foreman, all apart from the fact that this action absolutely precluded the results which it was hoped to obtain by the adoption of the system. Under a properly conducted labor department such a mis-carrying out of the management's intentions could not have occurred more than once, and then it would have been corrected immediately.

It is trite to say that the wage question is the most difficult to handle satisfactorily. Dissatisfaction with this question will breed more trouble than any other, and yet it is very difficult to determine upon any system of pay wholly satisfactory to all concerned. Of the several ones now offered to manufacturers, each is open to some objection and must almost always be specialized to some extent to meet the needs or conditions existing. To accomplish this is one of the valuable and best reasons for a labor department, beyond which its complete touch with the plant's employes enables the correction of evils arising from the pay system or their prevention before they occur. Some difficulty may be experienced at first by a labor department, arising from the antagonism of foremen who feel that their prerogatives are being infringed and their authority diminished, but an earnest endeavor to co-operate with them, will be at once appreciated, while the holding of foremen's meetings for discussion of labor and particularly management problems, has proven especially valuable as well as welcome to those attending.

The authority given the labor department should be great as well as broad, since any limitation or abridgment of the authority conferred foredooms it to failure. It should receive the whole backing of the owners. Confidence must be placed in those who conduct it, and their judgment and knowledge of conditions relied upon. Such a department stands in the place of the manufacturer, but with this difference, that the work is internal to the business and the attention remains wholly concentrated upon the broadest policy to be obtained by a view of the factory conduct as a whole.

Necessarily the work of this department demands that those who are to conduct it must be men chosen with particular care. Standing between the manufacturer and his employes, they must conserve the interest of the first while at the same time so handling the affairs of the department as to compel and retain the confidence of the workmen in the fairness of the department and its desire to insure their welfare. As has been intimated, familiarity with modern factory methods of organization and pay systems is essential and knowledge of mechanical productive methods most desirable. As upon the department's work depends the relations existing within the plant it is an integral and vitally necessary part of that production work whose regularity alone enables the commercial success of the business. For this reason it is obvious that those chosen to conduct such a department must be possessed of broad education, experience, tact and a keen sense of equity.

## CURRENT WAGE QUESTIONS.

May Day, which was anticipated with much apprehension on account of threatened labor troubles, has passed, and although it is estimated that nearly 60,000 men went on strike on that day, about half of that number were laborers employed on the sub-way in New York City, and conditions are not nearly so unfavorable as it was feared they would be. There are really few important strikes in the country among workers on new construction and in the metal trades. An official of the Steel Corporation has been quoted as saying that the changes in the wage schedule proposed by the Amalgamated Association of Iron, Steel and Tin Workers are so few and so unimportant as to warrant a prediction that the corporation will experience no serious labor disturbances during the current year.

Excepting the strike of sub-way laborers there are now no other important labor troubles pending in the metropolis. The threatened tie-up of harbor traffic has been averted by an agreement to refer the differences to arbitration. The threatened general strike of the boilermakers and iron shipbuilders in New York shipyards has been prevented by a compromise. An exception to the general rule in Greater New York of settling labor disputes satisfactorily is found at the Continental Iron Works, Brooklyn, where all the men employed, excepting twenty-five in the machine shop, went on strike May 1st.

In Philadelphia more than 7,000 men in the building trades went on strike May 1. This action indirectly will affect many other workmen unless the strike is settled.

May Day in New England was marked by no serious upheaval in any important industry, although a number of strikes which have been on for some time have not been settled.

In Cleveland, building operations have been somewhat interfered with by a strike among the workmen in the brick yards. Cleveland sheet metal workers have been granted an increase of about 10 percent in wages and have decided not to strike.

In Chicago there are almost no strkes pending in the metal working trades. The most important feature of the conditions under which the new trade year will begin is the nine-hour day, over 35,000 workingmen, including nearly all workers in the metal trades, having secured the shorter day. The men will receive the same wages for nine hours as they received for ten.

In Pittsburg and Allegheny, the boilermakers, ornamental and architectural housesmiths and stationery hoisting engineers went on strike, the employers having refused to concede their demands. Six hundred boilermakers and four hundred helpers are idle. They demand $4 per day and eight hours' work, which is an advance of 50 cents per day and a reduction from nine to eight hours.

In Baltimore there is a general strike of union workmen in the building trades. It is calculated that unless the strike is soon settled $8,000,000 worth of work now in progress will be affected.

The structural iron workers who were putting up the steel frame of a large building being constructed for the Standard Rock Candy Co., New York City, quit work a few days ago as the last beam of the ground floor was ready to be swung into place. The plant of this company was destroyed by fire on the 27th of December, and it was very anxious to complete the new building at the earliest possible date. The strike was due to the fact that the business agent of the iron workers' union declared that the men could not do another stroke of work until the contractor got rid of the particular brand of

hodcarriers employed and hired men belonging to the union which he approved.

Three hundred employes at the plant of the American Car & Foundry Co., at Wilmington, Del., struck last week because the company reduced the working day to nine hours with wages correspondingly reduced.

The strike of the molders of the American Car & Foundry Co., at Berwick, Pa., was ended on an agreement for a minimum wage of $2.50 per day. The men had been getting from $1.65 to $2.20.

Seventy molders employed in the five jobbing shops at Moline, Ill., have gone on a strike for a nine-hour day.

The machinists of the Kenova, W. Va., shops of the Norfolk & Western Railroad are on a strike. They went out on an alleged grievance that the foreman was opposed to unionism and domineered over the men.

Owing to trouble with employes in the stove foundry of Philips & Clark, Geneva, N. Y., the plant has been closed until the return of Walter A. Clark, president of the company, who is now on his way home from Europe.

The machinists of the Canadian Bridge Co., Walkerville, Canada, are still out on strike. Many are accepting positions in other places, while the company is filling their places with new men.

A somewhat ludicrous attempt of a few union structural iron workers employed by the Baker & Llewellyn Works, Los Angeles, Cal., is being made to unionize the iron works and force a raise of wages and reduction of hours. There is only a small number of men belonging to the union and the force who do not belong are still at work. The employers are determined not to recognize the union or grant a uniform scale for men of all degrees of ability, as the company has always paid its employes according to the amount and quality of work which they did.

## COMMENTS BY CHUCK MANUFACTURERS.

The article on "Types of British and American Scroll Chucks," which appeared in *The Iron Trade Review* for April 9, received some comment and, among others, two letters were sent in from well known experts in this field. Lucius E. Whiton, of the D. E. Whiton Machine Co., of New London, Conn., submitted an expression of opinion on the durability of the scroll chuck, which theoretically is supposed to have but a line bearing. Mr. Whiton says:

"It is my idea, based upon observation of these chucks, both in use and as returned for repairs after long service, that this durability and generally satisfactory service is primarily due to the little element of elasticity which exists in the scroll plate. In other words, when the chuck is tightened on the work, the scroll plate and thread are sufficiently elastic so that instead of conforming actually to the theoretical line bearing, the threads yield just sufficiently to contact in a broader way with the teeth of the jaws. This makes a grip which not only gives good wearing surface but also introduces the element of hug in such a way that the work will not jar loose, whereas in the independent jaw chuck the grip of the screw thread is more rigid.

"We have made a great many heavy geared scroll chucks for use on the modern turret lathes and have also a line of extra heavy independent jaw chucks especially designed for severe service. We have furnished a great many more chucks of the heavy geared scroll variety than we have of the heavy independent variety; but we have been called upon to furnish more repair parts for the smaller number of independent chucks sold than for the larger number of scroll chucks. In other words, the percentage of wear and breakage is very much greater in the independent chucks than in the scroll chucks, and some of our customers have mentioned the fact that the work in the independent chucks sometimes appeared to jar loose under the strain of heavy cuts while this has never been referred to by users of the scroll chuck.

"The elastic grip will 'hang on' against these vibrations much longer than the absolutely rigid grip, and we think this little point is extremely important in explaining the durability and generally satisfactory service of the scroll chuck when properly lubricated and taken care of."

Another manufacturer of chucks, T. R. Almond, of Brooklyn, N. Y., says: "There is one thing that perhaps may be worth mention in connection with your scroll chuck article, and that is the wrench or key for operating the screws. Many manufacturers pay little attention to the quality of this part of the apparatus. They send them out of such poor quality that they soon become almost useless for the purpose. Out of a dozen which I have in use all but one are worn so badly that it is difficult to keep them in place when operating the chuck jaws. The exception mentioned is made of steel of good quality and hardened. It always holds on without trouble, the hole is the same as to shape as when new and it will maintain its shape long after the chuck is worn out.

"When I buy tools my orders go, if possible, to the parties who pay attention to these seemingly unimportant items. If they will make a good wrench or key to go with the chuck, I feel sure that the chuck itself will be of the same quality. For the same reason, the machine in which the screw heads are as near uniform as possible will be more acceptable.

"To get the largest amount of good work out of a first class man, give him tools which do not distress his nerves. Keep him away from the too noisy gears of the carelessly made lathe or drill press. Comfort to the good workman means profit to the employer."

## Segregation in Steel Rails.

A correspondent of *Sparks* calls attention to a communication sent by C. H. Ridsdale to *Engineering*, which, treating on "Segregation in Steel Rails," comments upon a paper by Mr. Andrews on the same topic as follows: "Segregation may be regarded in some respects as a good thing, for it automatically purifies the outer portions which have to bear most of the strains, and drives the impurities to the central portion, which is the best possible position, as they can do least harm there. In any event, the impure portions are only, perhaps, one-tenth of the whole."

This is deemed a cheerful view to take of the matter, though not nearly so cheerful as the following extract from the same communication:

"There is an abundant mass of evidence * * * showing that the impurer rails with .11 to .15 percent phosphorus have longer life, stand more traffic, have fewer breakages, and when worn will stand a better impact test than purer rails with only .07 percent phosphorus."

To the writer it appears that the better results with the less pure material might be due, not to the larger percentage of impurifies the outer proportions which have to bear most of the temperatures, and more passes and lighter reductions. Certainly a large proportion of foreign matter in the steel is not to be sought nor commended.

The earnings of the Empire Steel & Iron Co. for the first quarter of 1903 were $137,558. The company shipped during March 31,000 tons of pig iron, and is producing about 1,000 tons a day. The improvements that have been in progress for about a year at its extensive ore mines in New Jersey are nearly completed and the output of ore will soon double that of any previous time. Over $1,000,000 has been expended in modernizing the twelve furnaces of the Empire Co.

The Sloss-Sheffield Steel & Iron Co. reports for March a surplus of $187,800, against $88,308 the same month last year, an increase of $99,492. The surplus for four months from December 1 to March 28 was $646,412, an increase of $485,838.

Dr. R. W. Corwin, of the Colorado Fuel & Iron Co., has announced that the company's old hospital will be remodeled and made a co-operative factory and trade school where aged and disabled employes may earn their living and children learn trades.

The Monterey Steel Co., Monterey, Mex., will commence in a short time to manufacture the first steel rails ever turned out in Mexico. The capacity of the plant will be 1,500 tons of rails daily from native iron ore.

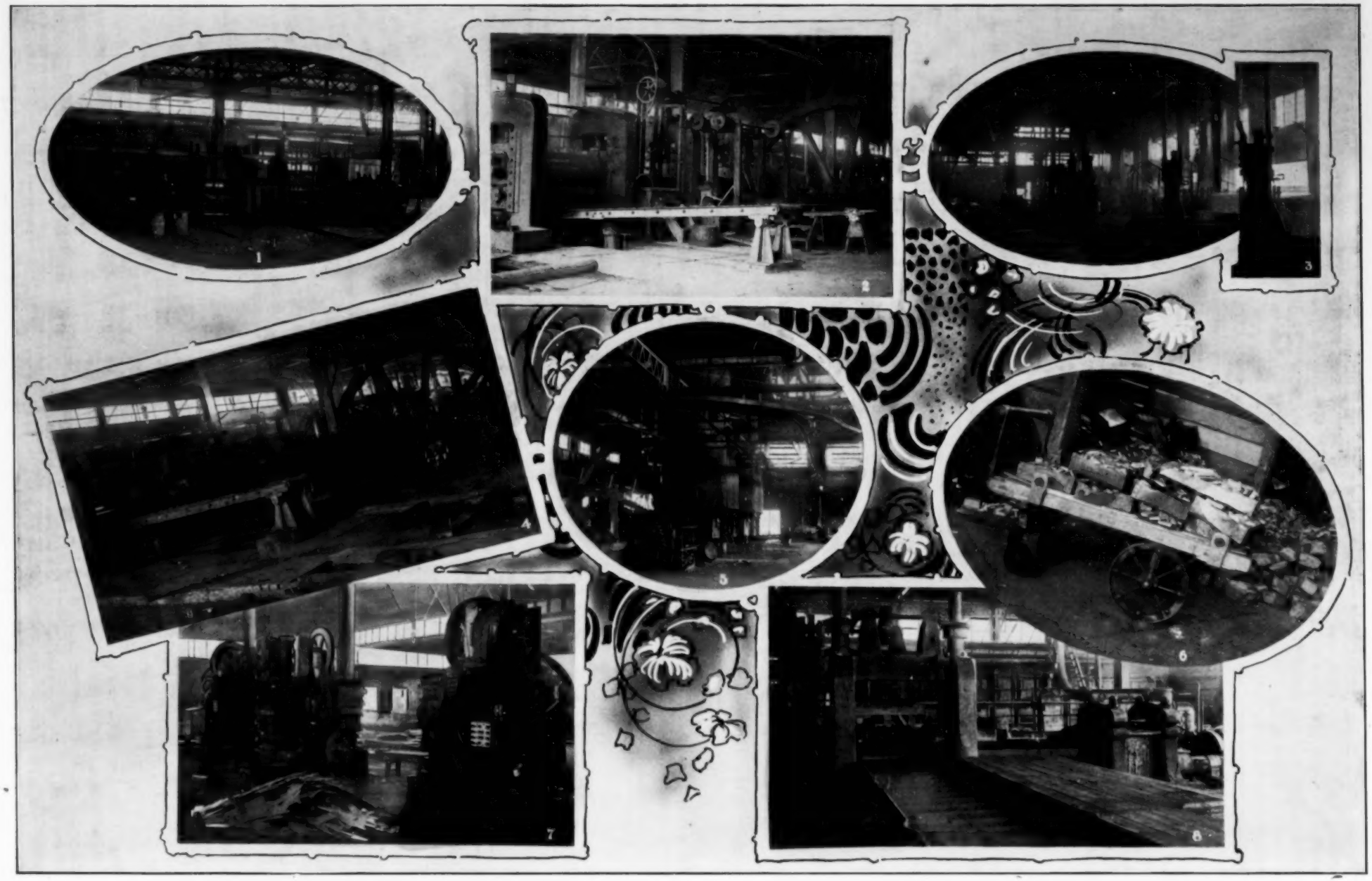

FIG 1.—16-INCH BAR MILL. FIG. 2.—28-INCH SAW PLATE MILL. FIG. 3.—GENERAL VIEW OF HAMMER SHOP. FIG. 4.—22-INCH SHEET MILL. FIG. 5.—PUDDLE MILL. FIG. 6.—BUGGY FOR CONVEYING LOADED PANS TO FURNACES. FIG. 7.—SHEARS FOR CUTTING AGRICULTURAL SHAPES. FIG. 8.—BLOOMING MILL.

## VIEWS IN THE COLONIAL STEEL CO.'S CRUCIBLE STEEL PLANT AT COLONIA, PA.

# The Colonial Steel Company's Crucible Steel Plant at Colonia, Pa.

The Colonial Steel Co., formed in 1901, has built one of the most modern crucible steel plants in the world. In it are used a number of improved methods, involving important departures from the older practice. The company operates under a Pennsylvania charter, with $1,250,000 capital stock. J. W. Brown is president, C. M. Brown secretary and treasurer, George A. Howe first vice president and T. H. Childs second vice president and general manager. The plant, which was completed in 1902, occupies a site of 45 acres at Colonia, Pa., fronting on the Ohio river, and 24 miles from Pittsburg on the Pittsburg & Lake Erie Railroad. The company thus has excellent rail and water shipping facilities, and has ample room for future growth.

### The Melting Shop.

While not first in logical order, the melting department involves such departures from ordinary practice as to merit first attention. The melting house is 128x210 feet, and is served by a 10-ton electric crane with a span of 57 feet 4 inches. On each side are four 24-pot crucible melting furnaces, making eight in all, and the design is such that four more can be added without interfering with operations at the present furnaces. The sheared muck bar has only 30 feet to travel from the puddling department to the melting house, where it is stored in bins running along the south side, or side next the puddling department. All scrap brought in from the outside is received on a railroad track running along the side of the building, and is stored in the same manner.

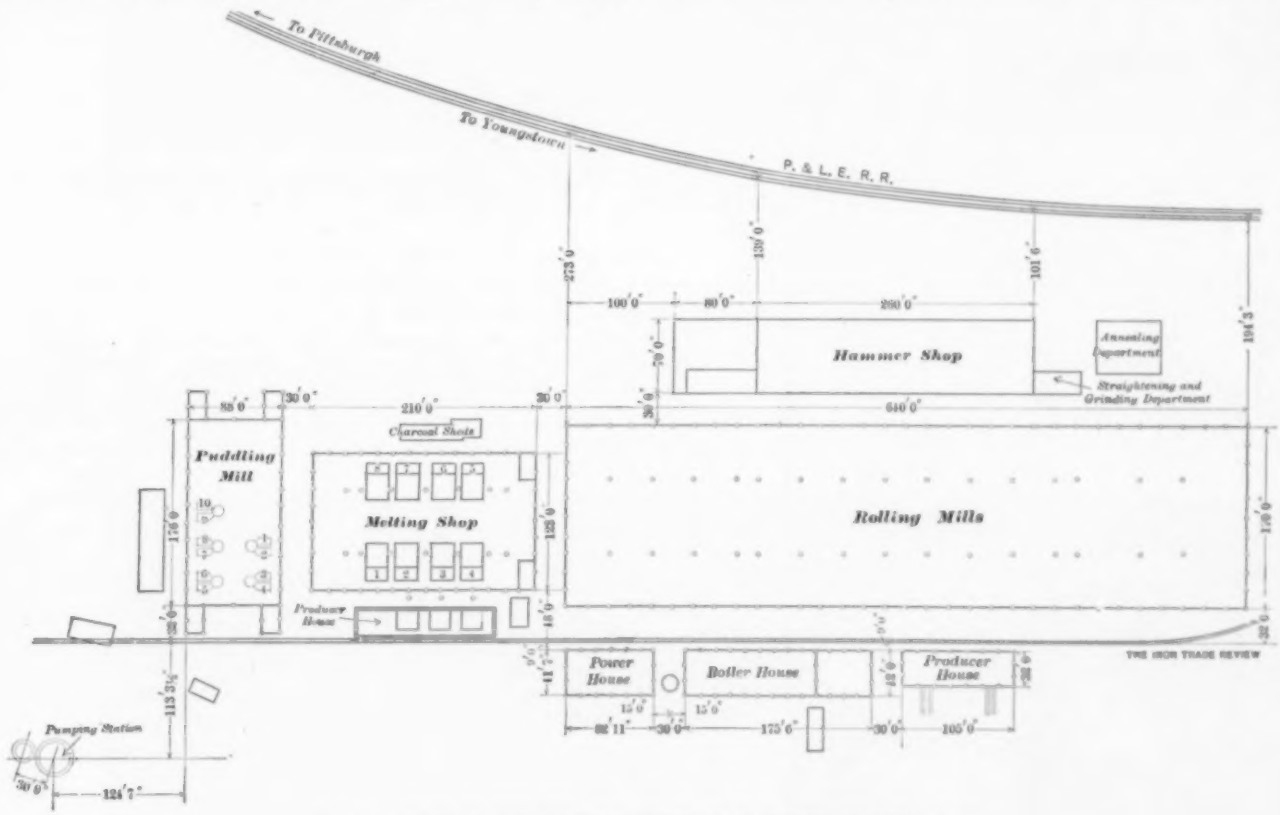


FIG. 9.—PLAN OF THE COLONIAL STEEL CO.'S WORKS, COLONIA, PA.

The furnaces are heated with artificial gas produced in six producers of the regular Siemens type, these being located directly west of the melting shop and in such position that the coal received from the overhead trestle is discharged directly on the floor of the producer house and has only to be shoveled into the hoppers.

The design and equipment of the crucible furnaces differ from that of any other such shop, as regards the method of casting the crucible steel ingots. The ordinary method is to cast each pot separately into a 4-inch square ingot. The method adopted consists in pouring by means of a ladle the entire contents of a furnace into one, two or not more than three ingots. In the older practice, the individual ingot for each pot resulted in a difference in temper, and the ingots at times showed a great variation, necessitating grading by inspecting each ingot. This inspection was made by breaking off a corner and determining the temper by an inspection of the grain. Naturally this method is open to error and the best of inspectors found their standards modified continually without their being aware of it. In the method here pursued, the furnaces are built with the floor at a height of 7 feet above the ground, the floor of the four furnaces on each side being continuous from one end to the other.

Over each furnace there runs lengthwise a trolley track equipped with a chain hoist which is used for charging the pots in the furnace and for drawing them out when ready for teeming. When the contents are fully melted, the pots are drawn out and carried forward on this trolley to the front of the furnace floor, where is arranged a casting in the shape of a half crucible, just large enough to hold the pot. This casting is revolved on a shaft operated by a lever, by which a workman overturns each pot and allows the contents to flow into a ladle. The reverse motion drops the empty pot through a hole on to a sheet of metal supported by springs which break the fall and allow the pot to slide down a trough to the ground, where it is dragged out of the way by workmen, until required for further use. The ladle receives the contents of the entire furnace, and the metal is then teemed in the regular way into ingot molds, the smallest of which are 9¼ inches square at the bottom.

This method secures a thorough uniformity of quality and temper for the entire heat, which is determined by chemical analysis in every instance, and the ingots graded accordingly, so that the desired temper of the steel sought can be determined exactly. In addition to this, there is an advantage in casting the steel in large ingots, from the additional amount of work put on the steel in welding and reducing it to merchantable sizes, as even the smaller sizes, 3-16 and ¼ inch, are made from ingots 9¼ inches square. Sizes over 4 inches round or square are made from ingots from 12 to 16 inches square, according to the size of the bar.

The advantages of this new method of operation may be

summed up as absolute uniformity and reliability of temper and greater toughness.

A narrow gauge track, on which runs a locomotive crane, extends through the north end of the melting house building, leading in one direction to the hammer shop, where the largest sized ingots are broken down on a 7-ton hammer, and in the other direction to the heating furnaces of the blooming mill, in which the smaller ingots are cogged.

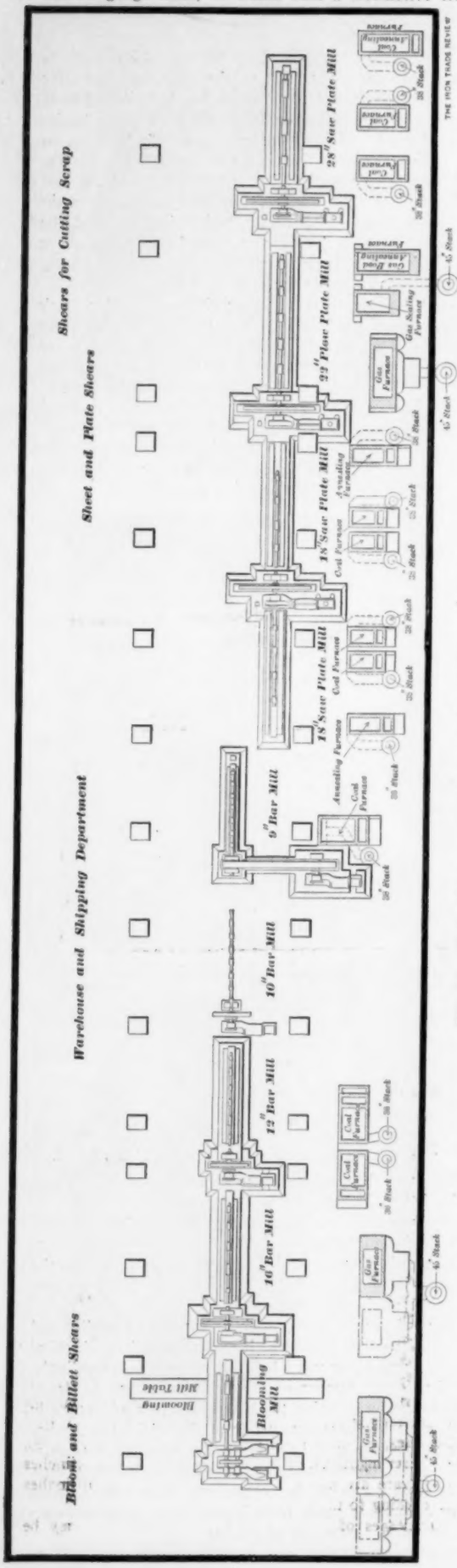


FIG. 10.—PLAN OF ROLLING MILL BUILDING, COLONIAL STEEL CO.

## The Rolling Mill.

The rolling mill building is 170x640 feet. It contains eight mills, all of which have their line of feed across the building. The raw materials are received along the east side of the building, and the finished products delivered along the west side. Along the east side is a trestle, from which the coal for the furnaces and producers is received. Underneath is a narrow gauge track on which the billets are brought. On the west side of the building extends a standard gauge track, so that a car can be stationed at any point along this side to receive finished material.

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The eight mills are as follows, in order:

A 28-inch two-high reversing blooming mill, driven by a pair of reversing mill engines, 26x36, by the William Tod Co. The ingots for this mill are heated in two gas fired furnaces 8x21 feet, and room has been left for another heating furnace if desired. The screw down and tables are electrically operated.

A 16-inch bar mill, containing four stands of three-high and one stand of two-high rolls, driven by a Buckeye Corliss engine. The billets are heated in two gas furnaces, 8x21 and 8x15 feet respectively.

A 12-inch bar mill, containing four stands of three-high and one stand of two-high rolls, driven by a Buckeye Corliss engine, 26x36. This mill has two coal fired furnaces 10x14 feet each. Adjoining this mill, as indicated in the ground plan of rolling mill, sufficient space has been left for the erection of a 10-inch bar mill and two furnaces.

A 9-inch bar mill, consisting of six stands of rolls, the entire roll train being operated by a Buckeye Corliss engine, 24x36. There is one coal furnace, 10x14 feet.

Two 18-inch saw plate mills, consisting of three stands of rolls each. One mill is placed on each side of the 30x60 Mesta Machine Co. Corliss engine. Sufficient room has been left on each side of the train for an additional stand of rolls, making four stands on each side of the engine, which equipment could then be operated as four separate mills, each having one roughing and one finishing stand. Each of the two present mills has two coal fired furnaces, 6x10 feet, and one annealing furnace, 6x13 feet.

A 22-inch plow plate mill, with four stands of two-high rolls, driven by a 30x60 Mesta Corliss engine. The mill is served by a gas furnace, 8x21 feet, and has also a gas scaling furnace, 8x14 feet, and a gas hood annealing furnace, 8x22 feet.

A 28-inch saw plate mill, with two stands of two-high rolls, roughing and finishing, driven by a 30x60 Mesta Corliss engine. This mill is provided with two 8x15 feet coal heating furnaces and one 8x20 coal annealing furnace.

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The whole rolling mill building is commanded by a 15-ton electric traveling crane. The mills occupy the main span of the building, the lean-to on one side containing the furnaces, and the lean-to on the other side the shears, warehouses, cooling beds, etc. In the general arrangement of the rolling mill a large number of narrow gauge railroad tracks were provided, for various purposes, including the carrying of the scrap from the shears to the bins in the melting shop. A locomotive crane is used for conveying the ingots from the melting shop to the yards adjoining the hammer shop, where they are sorted and piled according to the analysis and temper.

## The Puddle Mill.

As will be seen by reference to the plan of buildings, they are so laid out that the progress of the material through the various processes of manufacture is continuous from one end of the plant to the other. At the extreme south end of the property is the puddle mill building, on each side of which are standard gauge tracks supplying all raw materials. On the east side the elevated trestle brings the coal and iron ore, and on the west side are brought pig iron, limestone and other supplies. The building at present contains ten single puddling

FIG. 11.—INTERIOR VIEW OF MELTING SHOP SHOWING TROLLEYS FOR LIFTING POTS OUT OF FURNACE, ALSO CRANES FOR HANDLING INGOTS AND MOLDS.

furnaces, a stand of three-high 18-inch muck rolls and squeezer, all operated by a Bates Corliss engine. The building is designed for eight additional puddling furnaces, which can be erected at any time without interfering with work in the original plant. The puddling furnaces are built in pairs and over every pair is erected a Cahall waste heat boiler of 100 h. p. At the present time there are located close to the muck mill three shears for cutting bars into short pieces as required for melting in crucibles. These shears are the ordinary alligator pattern and each is driven by an independent electric motor.

The puddle mill building is 176x88 feet. On each side, and running the entire length, is a 3-ton crane, with a 15-foot span. When unloaded from the trestle, the coal and iron are carried in self-dumping buckets to the furnaces, while a similar method is employed to carry the ashes to self-dumping cars

FIG. 12.—METHOD OF CASTING, SHOWING MOLDS, TABLE AND MECHANICAL DEVICE FOR EMPTYING POTS.

on a narrow gauge track leading to the dump. The pig iron for each heat is piled on a platform in the stock yard, and carried by the crane to its furnace. An elaborate trolley system is provided for carrying the muck balls from the furnaces which are annealed in long pipes, packed with charcoal.

### The Hammer Shop.

The hammer shop is 70x260 feet, and contains nine steam hammers, the largest having a capacity of 12,000 pounds and being used for forging ingots up to 16 inches square into billets for the rolling mill, as well as for large forgings. Two post cranes command this large hammer, and the ingots are heated in two coal fired furnaces. The hammer next in size has a capacity of 6,000 pounds and is used for finishing work from the largest hammer. It is commanded by one post crane and two coal fired furnaces. The seven remaining hammers are as follows: One 2,000 pounds, one 1,500 pounds, one 1,250 pounds, one 1,000 pounds and three 600 pounds. Each hammer is provided with a separate heating furnace. The smaller hammers are used for forging all kinds of merchant bars.

The hammer shop is equipped with two cutting off machines, one 10-inch and one 4-inch, operated by variable speed motors. These cutting off machines, as well as two horizontal straightening machines, are located in the extreme end of the hammer shop. Just outside the hammer shop are located the four annealing furnaces, which are coal fired, and are used in annealing high grade steel. They take bars 16 feet in length, to the squeezer.

### Gas Producers.

There are two gas producer plants, which supply all the gas required in the gas fired furnaces in the rolling mill and the eight crucible furnaces in the melting shop. The melting shop producer house is 150x30 feet, containing six Siemens producers, with two more now under erection. The rolling mill producer house is 105x32 feet, containing six water seal gas producers, with room left for two more. The two producer plants are on a line with the trestle, and the coal is brought to the bottoms of the producers by chutes.

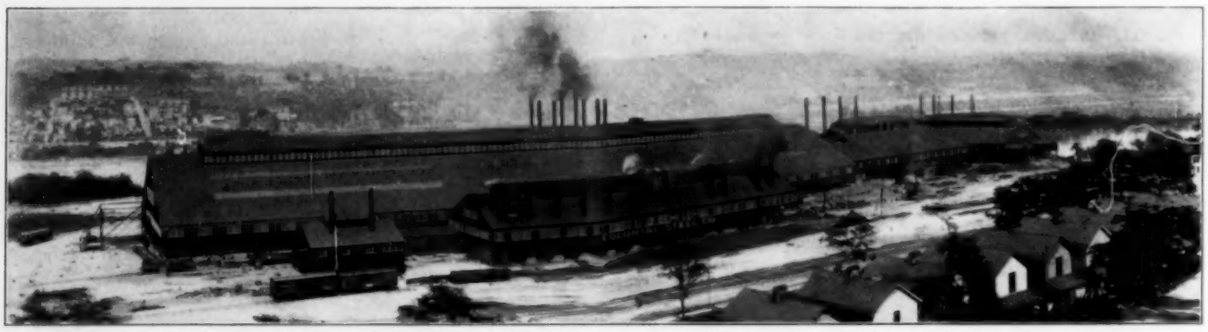

FIG. 13.—GENERAL VIEW OF THE COLONIAL STEEL CO.'S PLANT AT COLONIA, PA.

### Electric Driving Equipment.

All the shears in the rolling mill and the puddle mill are driven by three-phase alternating current motors, this type having been found to give the best service for this purpose. The rolling mill contains 24 shears of various types, as follows: Single vertical billet shear for cutting billets up to 4x8 inches, operated by a 30-h. p. motor; double vertical shear for cutting up to 3 inches square, operated by a 30-h. p. motor; double vertical lever shear for cutting bars up to 2x2 inches, operated by a 20-h. p. motor; vertical open front sheet shear, operated by a 10-h. p. motor; guillotine sheet shear, with a 126-inch blade, operated by a 5-h. p. motor; lever shear, operated by a 10-h. p. motor; four sets of double vertical plate shears for shearing plow plate, each having a 30-inch blade, and operated by a 30-h. p. motor each; lever shear for cropping, having a 30-inch blade and operated by a 10-h. p. motor; plate shear having a 108-inch blade, operated by a 75-h. p. motor, and cutting plates up to two inches thick; two lever sheet shears, with 30-inch blades, operated by 10-h. p. motors, and cutting packs; a battery of 10 alligator shears for cutting scrap, operated by belt from a single shaft driven by a 20-h. p. motor. All the clippings from the plates and sheets are cut up by these 10 shears and this scrap is loaded onto a large platform and conveyed by the electric crane to the end of the mill, to be loaded into cars and hauled to the scrap bins in the melting shop.

An electrically driven roll lathe, and a temporary machine shop, with 48-inch planer, 26-inch lathe, radial drill and shaper, are also located in the mill building.

All of the shears, cranes and machine tools, together with the blooming mill tables and screw down, are electrically operated, and the electrical power house is well equipped to furnish all the power required. This building is of brick, 82 feet 11 inches long and 41 feet 7 inches wide. An overhead crane, hand-operated, with a capacity of 10 tons and with a span of 40 feet runs the length of the building. The power is generated by two large dynamos installed by the Westinghouse Electric & Mfg. Co. The larger of the two is a 375-k. w., three-phase, 220-volt, alternating current dynamo, direct connected to a pair of automatic Buckeye engines each 18¾x30 inches. The other is a 200-k. w., 250 volts direct current generator direct connected to a Buckeye automatic engine 20x21 inches. A 150-k. w. rotary converter is used for furnishing the direct curent when only the alternating current generator is in use or for furnishing the alternating current when only the direct current generator is in operation. Thus when no extraordinary loads are carried either one of the machines can furnish all of the power required, and when the two machines are in operation the converter is used as a balance between the two. The switchboard is an elaborate affair consisting of ten panels. Two boiler feed pumps of the Stilwell-Bierce & Smith-Vaile type each 9 and 14x8x15 inches are contained in this plant together with a 3,000-h. p. Webster Star vacuum feed water heater. Two smaller pumps made by the Snow Steam Pump Co. are also operated for supplying water to the properties of the Allaire Land Co. All the pipe-fitting and high pressure work was done by the Central Pipe Valve & Construction Co., of Allegheny, Pa., using iron pipe exclusively, with steel couplings.

The boiler house is 175 feet 6 inches by 42 feet and contains eight 250-h. p. Babcock & Wilcox water tube boilers. The five boilers in the puddle mill together with this battery of eight have a combined capacity of 2,500 h. p. The coal is carried to the floor of the boiler house by means of a chute leading from the trestle from which the coal cars are dumped. The ashes are hauled out by hand to a nearby dump, this method having been found as cheap as a mechanical conveyor.

A pumping station is located on a hill at the bank of the Ohio river, containing a wet and dry well, the wet well being 47 feet below the surface. Compound steam pumps having a capacity of 700 gallons p. m. pump the water from the wet well into a stand pipe 75 feet high and 16 inches in diameter, from which it is distributed throughout the works.

The entire engineering work was in the hands of Julian Kennedy, who has provided a plant of marked completeness and well calculated to secure the best economy in production.

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As a sequel to the filing of trust mortgages aggregating over $27,000 by the Lansing Boiler & Engine Works, Lansing, Mich., creditors filed in the United States court a petition to have the company declared bankrupt. The petition alleges that the filing of the trust mortgages was done to secure certain creditors to the exclusion of others.

## 42-INCH ROTARY PLANER.

The illustrations in Figs. 1 and 2 show a recently designed 42-inch rotary planer on a round base, the planer bed having a circular adjustment on the subbase by means of the lever, pinion and rack shown in Fig. 1. These machines are specially designed for facing plane surfaces on columns, chords, etc., for iron bridge building, architectural iron work, and many similar purposes where a large flat surface is to be machined. The principal features of the machine illustrated are the positive drive by silent chain from motor, the quick return to head which is also operated by the same make of chain, and a ball bearing thrust in the worm box.

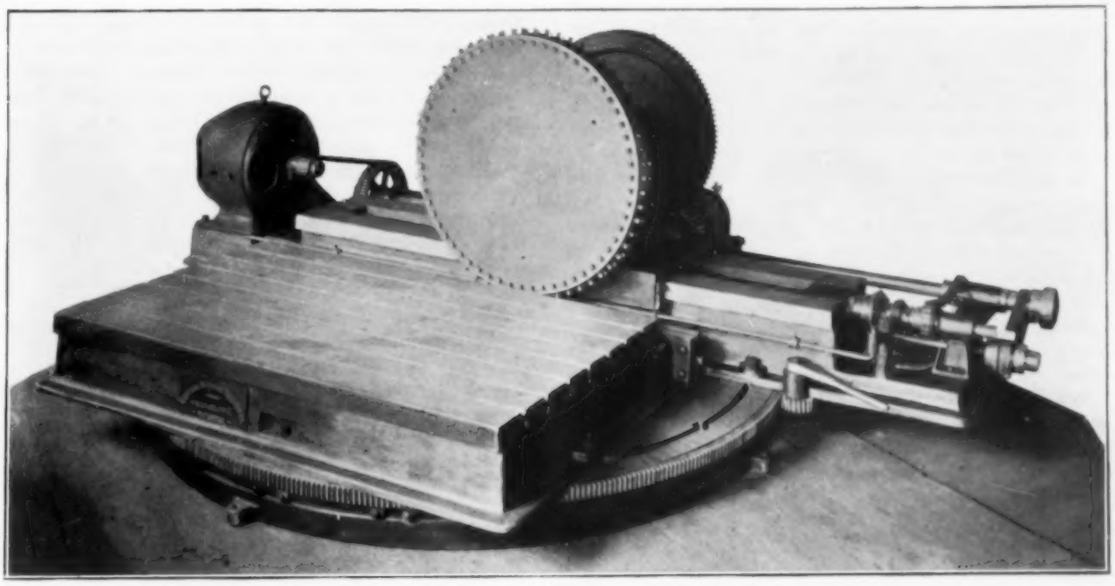

FIG. 1.—42-INCH ROTARY PLANER.

The cutters are set in a heavy plate wheel at a suitable angle, the cutter head being equipped with sixty cutters made of high speed steel. The spindles are of large diameter carried in a traveling head on the base plate and are driven with a large spur gear and wormwheel. The cutter head has an adjustment of 2½ inches in and out from the work table.

The driving worm is made of crucible steel and runs constantly in an oil bath, the worm meshing with a phosphor bronze worm wheel. The machine is provided with an automatic stop which operates at any length of cut. The machine as illustrated will cut a length of 7 feet but can be made to suit requirements of purchaser. The weight of this 42-inch machine is about 25,000 pounds. The machines are made with or without rotating bed and are manufactured by the Keystone Machine Tool Works of Philadelphia.

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Fred Winder will build a foundry and machine shop at Gas City, Kansas.

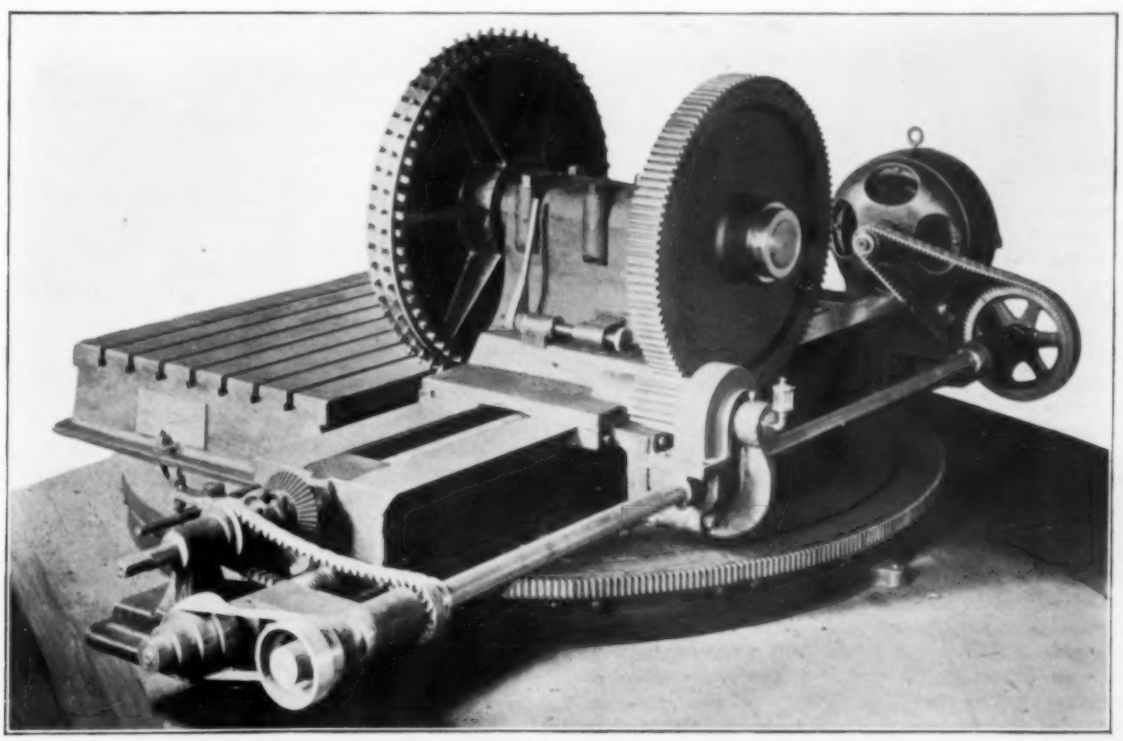

FIG. 2.—REAR VIEW OF 42-INCH ROTARY PLANER.

## A NEW FILING SYSTEM.

BY KENNETH FALCONER.

The filing system here described may not be a new thing, though so far as I know I originated the plan some years ago. It has since been in constant use, though not to quite the extent originally intended, and has been found so much more satisfactory than any method previously used that a description of it may be of interest.

The problem was to file away sheets 11 inches by 6 inches containing records of costs of manufacturing orders, no order being issued bearing a higher number than 9999; upon reaching that number a new series began again at 1. The desire was that beginning at a certain date all finished orders should be filed together quite irrespective of date either of issue or of completion, and that the number of an order being known it might be instantly procured even without any further knowledge of its date, article manufactured, or for whom. The difficulty consisted in the great number of orders going through the works resulting frequently in two orders bearing the same number going through the shops at the same time and neither of them finished.

The plan adopted was designed to provide for filing the finished orders for five consecutive years without requiring any readjustment of the boxes, and with the main object always in view of instantly procuring any desired order, the number alone being known, and so far as possible eliminating any possibility of putting an order away in other than its proper place. The idea was that when six

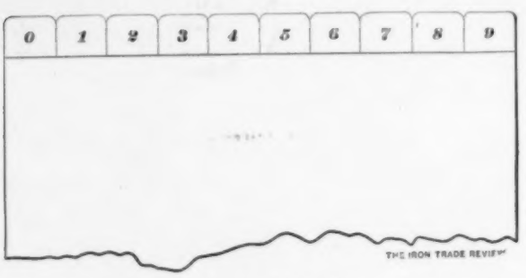


FIG. 1.—INDEX SHEETS.

years' records should have accumulated those of the first year should be removed, thus leaving records of costs of the current year and five preceding years always together and immediately available. As a matter of fact, the result is somewhat better than this. From present indications we will always have in the current filing boxes the statements of cost of seven or eight years immediately preceding instead of five years as planned for.

Beginning with January 1, a new series of orders was commenced numbered from A1 to A9999, and that number being issued the next series ran from B1 to B9999, and so on to the end of the alphabet. One hundred cloth covered boxes were provided one-half inch longer and one-half inch wider than the sheets they were to contain. They were about three inches deep, and an estimate led us to believe that these boxes would hold the cost sheets of about five years' records. One end of these boxes (that corresponding to the top of the cost sheet) was hinged to the bottom of the box so that on removal of the cover, which was an inch deep and very strong, it fell down, giving free access to the tops of the order sheets which were numbered in the upper right hand corner. Each box contained ten manilla sheets, the same size as the cost sheets with a projection about half an inch deep at the top and ranged across the width on the same plan as the guide cards commonly used with card indices. The projections are numbered 0 to 9. Fig. 1 represents a set of these index sheets as they appear in each box before any orders are put in.

A set of shelves were provided to hold these one hundred order boxes, each box having its own compartment and the shelves being cut out in a small half circle so that the boxes might be readily and easily withdrawn. The order boxes are numbered from 0 to 99, the compartments or shelves bearing corresponding numbers to ensure the boxes being always returned to their proper places. Owing to these numbers and the numbered guides sheets, in each box, it will be seen how quickly completed orders can be filed away after the costs have been made up, and with how little liability of being put into a wrong place. Without regard to this prefix, any order with a number lower than 100 goes in box 0; from 1 to 199 in box 1, and from 5800 to 5899 in box 58, etc. On removing the cover to put an order away the index sheets furnish a further guide to its correct place, further minimizing the chances of a mistake and practically insuring that no order can be filed away, even by a careless clerk, more than nine numbers out of its correct place. In the case of orders of different series bearing the same number, the prefix determines their relative positions. These numbered guides and the numbers on the boxes have been found of equal value in looking for an order as in filing orders away. The position of the box makes it easier to handle than any filing box that is kept on edge, and moreover, particularly when the box is only partly full, keeps the papers in better condition, more plumb on the edges, and, as a consequence, more convenient to handle. It also overcomes entirely the chances of the box bursting open when taken from its place, and the contents dropping to the floor. This is likely to happen and does sometimes happen with the best of filing boxes standing upright instead of lying flat. As has been stated, we figure that these boxes will hold say seven years' records. When they get too crowded all orders whose numbers bear the prefix A will be removed; later on, those with C, D, E, etc. Just what we will do for a prefix when we come to the end of the alphabet I cannot say; probably the original series A will be so old by that time that we can begin with that letter again. That contingency, however, is so remote that it need not cause worry for some time.

In filing or looking up orders, their correct position will be indicated as follows:

Hundreds—the number on the box.

Tens—the number on the index card.

Units—the terminal figure of the order.

Thus order No. 5154 belongs in box No. 51, and should be the fifth order under index sheet No. 5. The relative position of each order bearing this number is determined by its prefix.

Regarding the oral expression of an order number: Assume that each such number is divided into two parts, primal and terminal, the latter represented by the last two figures and the former by those preceding. In speaking of an order number, the primal is expressed by the word representing the quantity indicated by its figures—the terminal by the names of the figures of which it is composed. Thus No. 5827 would always be called "Fifty-eight-two-seven"; No. 2758 would be called "Twenty-seven-five-eight." This is just one of those little points that are of more use than might be thought.

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NOTE.—Part of the above article has appeared in the *Bookkeeper*, but the author has revised it for present publication.

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A 9x12-inch catalogue issued by the Niles-Bement-Pond Co., of New York, is also a notable instance of book making for trade purposes. The amount of space to the page has allowed a spread of illustrations which the firm has used with most satisfactory results. The halftones show a few recent designs in multiple drilling machines, including standard heavy tools for railroad and general work, as well as several machines of the Pratt & Whitney Co.'s design, specially built for the drilling of duplicate parts in the manufacture of automobiles, typewriters and other light work. The machines are of two general types; multiple drills, in which the spindles are adjustable to any position in a straight line, and adjustable multi-spindle drills, in which the spindles may be arranged in a group of any size or shape within the capacity of the machine.

## A NOVEL COMBINATION GRINDER.

Fig. 1 shows a new combination grinder, the dismounted spindle being illustrated in Fig. 2 and showing the self-oiling bearings as well as the ball-bearing end thrust. The machine consists essentially of a suitably mounted main spindle having at one end a 23-inch disc grinder, and at the other end is fastened a water grinder with an 18-inch ring of solid emery mounted in a forged steel chuck surrounded by a water hood and equipped with a circulating pump and pipe fittings. The forged steel chuck is shown piecemeal in Fig. 3 and is also illustrated with the emery wheel in position and ready for use on the machine, the ring of emery being held by the circumference. Both ends of the machine are furnished with a table, as seen in Fig. 4, which may be set at any angle and is capable of a rocking movement parallel with the face of the wheel. The table has also a feed motion toward the emery wheel which may be operated by means of a lever and absolutely controlled by a micrometer stop screw. Work can be sized to thickness required and angles carefully ground with the aid of these tables.

The firm has been led to design this machine because of the conviction that disc grinding has two weak points—the disc grinder being unsatisfactory on large areas of cast iron or where much stock has to be removed owing to the ready glazing of the iron. Of course the designer had in mind, as large areas, surfaces of ten or more square inches. There is also a class of work which evidently will not stand the heat developed by a disc. The water grinder applied to this machine is intended to cover these requirements and at the same time the emery wheel has the manifest advantage of the very rapid speed of a disc grinder, a speed which would be impossible with the emery wheel mounted in the usual way. The peripheral grip on the emery wheel and the character of the steel forging in material and design enable the safe attainment of a speed which is as unusual as it is economical.

The machine as illustrated is furnished with two steel discs, 23 inches in diameter, a press for cementing the paper discs, countershaft, pump and piping, forged steel chuck with 18-inch ring of emery and carefully balanced, two standard tables, one dozen sample sheets of various grades of emery paper discs and wrenches for all adjustments. The machine weighs 1,400 pounds and the dimensions of the base are 24x24 inches, the height is 4 feet 8 inches. It is manufactured by the Bayldon Machine & Tool Co., of Jersey City, N. J.

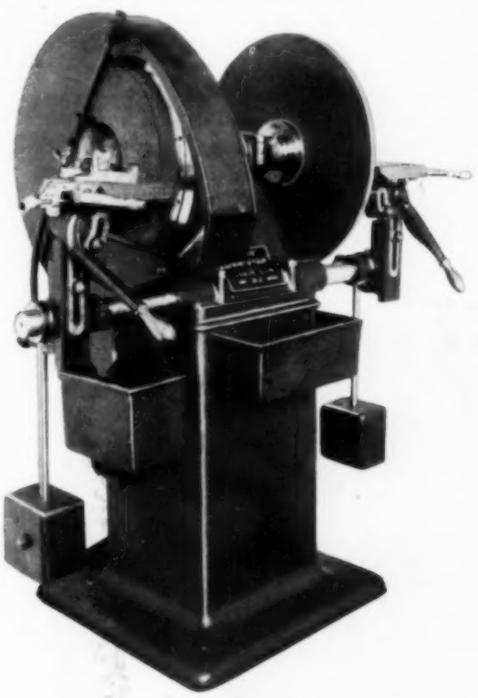


FIG. 1.—THE BAYLDON COMBINATION GRINDER.

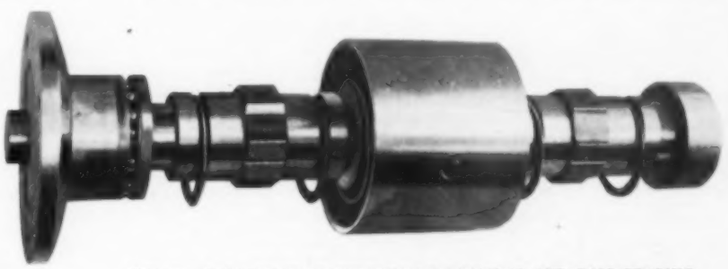


FIG. 2.—SPINDLE WITH SELF OILING BEARINGS AND BALL-BEARING END THRUST.

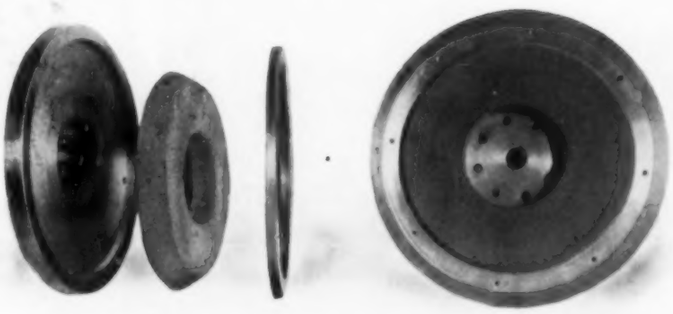


FIG. 3.—MOUNTED AND DISMOUNTED CHUCK AND EMERY WHEEL, THE LATTER HELD IN CHUCK BY RIM GRIP.

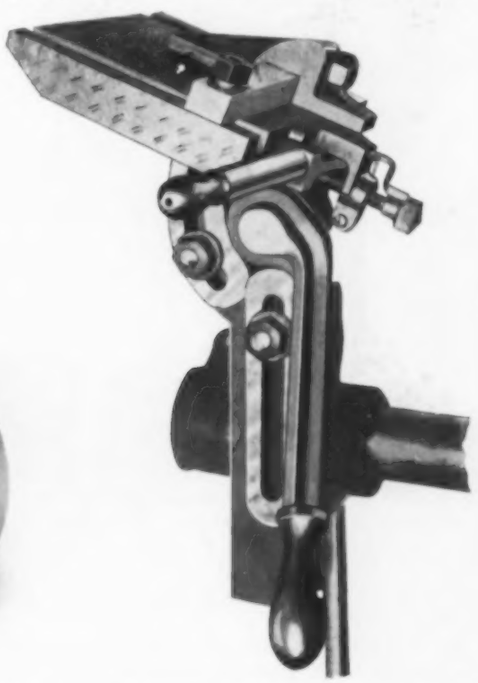


FIG. 4.—TABLE USED ON COMBINATION GRINDER.

The F. P. Smith Wire & Iron Works, 100-102 Lake St., Chicago, manufacturers of ornamental and structural iron, art brass and wire work, have been appointed sole agents in Chicago, and several states adjacent thereto, for the Columbus Steel Rolling Shutter Co., manufacturer of rolling steel doors for freight houses, car barns, warehouses, etc. Owing to the large number of inquiries coming in from all over the United States and foreign countries, from engineers, architects and builders, agencies are being established in all the large centers with representative firms in architectural or engineering construction work.

## NEW UNIVERSAL MILLING MACHINE.

The universal milling machine recently designed by the Oesterlein Machine Co., of Cincinnati, O., embodies late developments in this line of machine tool construction. All parts of the machine are of easy access, and the wearing surfaces and spindle bearings are of large proportions to withstand severe service. Flat bearings are scraped to surface plates and all cylindrical bearings are ground and fitted to standard gauges. An important feature is the all-gear feed mechanism which avoids the use of bevel gears, chains or worms. The designer has applied spur gears to the feed mechanism and made the whole arrangement strong enough so that the belt on the machine cone will yield before any part of the feed-motion will break. The firm, during a test of the machine, had a cut taken with a 2½-inch diameter mill, having a 5½-inch face. The cut was 7-32 of an inch deep in cast iron, feeding .066 inch per revolution of spindle, the spindle running in back gear 22 revolutions and feeding 1.32 inch per minute. When the cut was increased the belt came off the cone.

cone has four steps for a 3-inch belt, the diameters being 12 inches, 9¾ inches, 7½ inches and 5½ inches. The back gear ratio is 6.3, which will give, with the countershaft running 100 revolutions, a speed of 228, 130, 76, 43, 20, 12, 7 revolutions per minute. The arm is 4 inches diameter. Distance from center of spindle to arm 7 inches, greatest distance between end of spindle and arbor bearing is 15½ inches. The arbor support can be taken off the arm. The brace is in one piece, can be readily put in position and is clamped tight with but one screw.

The table is 40 inches long, 9 inches wide, has 3 T-slots ⅝ inch wide. It has a quick return of 3 to 1 and can be operated from either end. It has screw feed, and screw has adjusting nut to compensate for wear. The table is thrown in gear by means of a clutch on the screw; this clutch does not ride on the screw directly, but slides on a sleeve so as not to injure the screw. The whole is a very simple and positive movement without any springs, and stops the table within a thousandth of an inch. The table has an automatic longitudinal feed of 24 inches, automatic cross feed 7½ inches, and can be lowered 18 inches from center of spindle. The swivel is pivoted into the saddle and clamped on the outside flange, thereby insuring an unusual solidity. The clutch handle on elevating screw

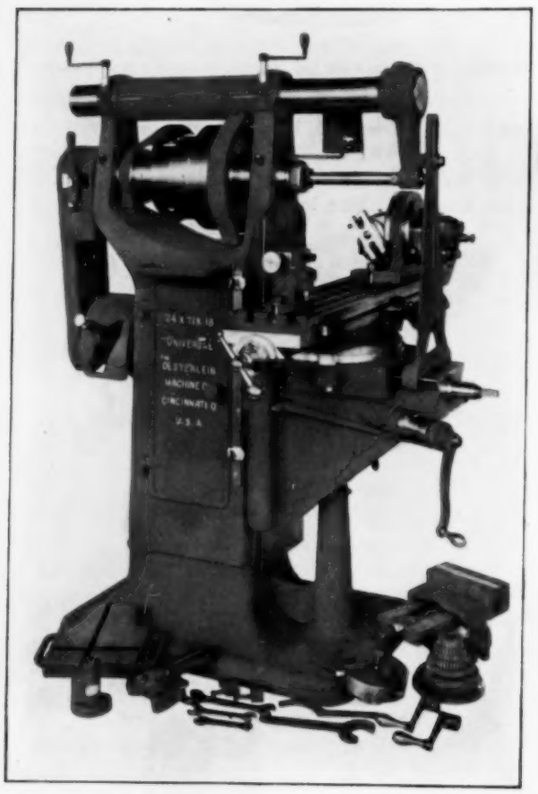


FIG. 1.—A NEW UNIVERSAL MILLING MACHINE.

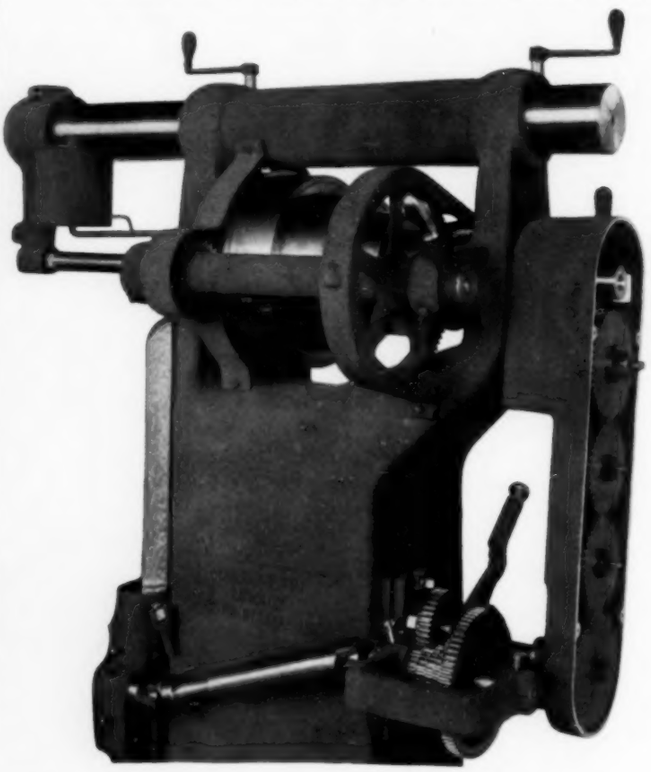


FIG. 2.—REAR VIEW OF UNIVERSAL MILLING MACHINE, SHOWING GEARING.

Fig. 1 shows the complete machine and Fig. 2 is taken from the opposite side and shows the feed gear boxes with covers removed. All screws have graduations reading to 1-1000 inch. All gears are covered by protecting guards. The gears in the saddle are oiled through holes in back of the swivel. The bearings and clutches in swivel are oiled through the centre table slot; by moving the table clear to the end, the oil holes come in line with the bearings. All oil holes are protected by screws or dust covers.

The column is of box form, well braced and of ample weight. It has a cylindrical brace between the uprights to strengthen them. The spindle is of crucible steel, with a hole its entire length; has a No. 10 B. & S. taper; front end is threaded for standard cutters, thread being covered by cap nut when cutter is not used. The front journal is tapered and is provided with a lock nut to compensate for wear. Spindle bearings are of bronze, taper in column and are held in position with lock nuts. The

and cross screw may be used simultaneously without interference. The elevating screw has ball bearing.

The feed device is a positive gear drive and consists principally of two gear boxes: an upper one which takes the power from the spindle and transmits it to the lower box; the upper box contains a sliding gear on the spindle operated by a lever to make one change of speed. The lower box contains a cone of gears, and a sliding gear by means of which the different gears may be engaged; the change is made instantly by engaging the sliding gear to any one of the cone gears while the machine is running. All gears are of steel and cut from the solid. An index plate giving the amount of travel for each gear is affixed to the feed box, so the operator can readily see what feed he is using. The feed changes are .004-inch, .006-inch, .008-inch, .011-inch, .014-inch, .017-inch, .020-inch, .029-inch, .039-inch, .052-inch, .066-inch, .091-inch to one revolution of the spindle.

The dividing head is of a new design. Its construction

permits a closer alignment of the spindle. It is very rigid and swings clear around that the work may be operated from either side of the head. The spindle may be clamped tight so as to release the indexing pin from all strain. It has a No. 10 B. & S. taper, swings 11 inches in diameter, and 19 inches between centers. The back center is adjustable and can be lowered and raised positively by means of a worm and rack. The swivel vise has a graduated base and the jaws are 1¾x9 inches, opening to 6 inches.

The countershaft has two friction pulleys, 14x4 inches, and is run about 140 revolutions per minute. The machine is regularly furnished with power feed for the table and power cross feed in line with the spindle. The power vertical feed is extra. Price includes change gears, index plate and table explaining the same, center rest, raising block, three jaw chuck, wrenches, vise, table stops and countershaft. Weight of machine ready for shipment, 2,600 pounds, net about 2,400 pounds.

## A SIMPLE HEADING DIE.

BY ROBERT A. LACHMANN.

Having been given a die outfit to make which required 30 plain round punches made of 13-64-inch drill rod set in a circle, I decided to drill the punch holder plate (made of mild steel) from the die in the usual manner. The back of this plate had

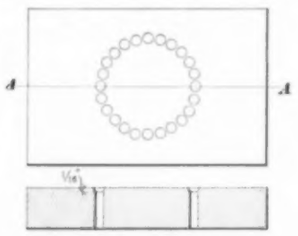
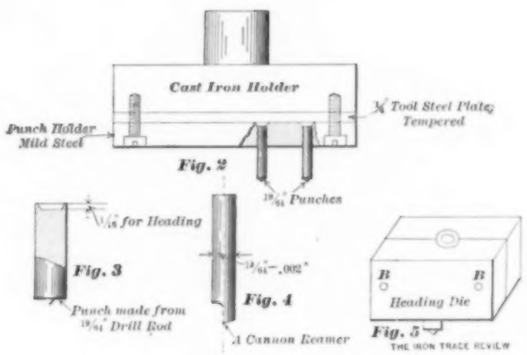



*Fig. 1. Section through A-A of Punch Holder.*




THE MAKING OF A PUNCHING DIE.

the holes counterbored with a 60-degree center reamer, as shown in Fig. 1. The method of holding the punches was simply to form a rivet head on them to prevent them pulling out when on the up stroke. The outfit was intended for punching ⅛-inch steel, and as this required quite a pressure, I decided to place a hardened steel plate ¼ inch thick, drawn to a very dark straw color, bordering on purple, between the punch holder proper and the cast iron punch-plate holder. (See Fig. 2.) I cut off fifteen of the punches the extreme length possible, the other fifteen being made 1-16-inch shorter and placed alternately around the circle in order to make the punches secure against shearing. I turned small "teets" on one end and counterbored the other end to facilitate upsetting. (See Fig. 3.)

Owing to the fact that the punches had to be a good driving fit in the punch-holder plate in order to make them rigid, I found it was impossible to drive them in while soft (for the purpose of heading) as they cut the hole as well as themselves very badly. To attempt to head them after they were tempered I did not deem advisable, even though the "teet" end only was hardened. I overcame the difficulty very easily by making an inexpensive heading die, which was made in two parts of scrap tool steel in the following manner:

I first clamped the two pieces in the milling machine vise with tops of both pieces even and took a cut off about 1-16 inch, to insure getting under the outer surface, which will not harden readily. Then I made a prick punch mark at the parting line and took the vise and all over to the drill press and drilled a 32-inch hole through the two pieces and counterbored the top part of hole also with 60-degree center reamer, but about 1-64 inch deeper than the counterbored holes in punch-holder plate. After counterboring I ran through a cannon reamer which I made from a piece of the 19-64-inch drill rod by simply filing it .002 under size and filing a flat on the end about ¼ inch back and to the center, as shown in Fig. 4, the end of the reamer being ground so the center A could do the cutting. This tool I used for reaming the 9-32-inch holes drilled in the punch plate and got very nice smooth holes with it. After reaming the hole I took the pieces out of vise, made them glass hard, and, finding they had contracted slightly, I ground the extreme edges of the two halves slightly so the punches could seat themselves properly. I also ground a slight amount off the faces of each half to allow them to bind the punches better.

I forgot to mention that I drilled two holes as at B B, Fig. 5, (before hardening), by simply gripping a C clamp onto the pieces before taking them out of vise to keep the two halves in proper alignment with each other. The rest was easy; it was simply a matter of placing the punch in the holder with the counterboard end up and by leaving this end project 1-16 inch beyond the top of heading die and clamping good and tight in bench vise, and using a small ball pene hammer, an excellent head was formed which was flush with the top, owing to the counterbore in die being 1-64 inch deeper than the counterbore punch-plate holder. The heads projected somewhat when the punches were driven home after the ends had been hardened. The headed end being soft enough for filing, allowed these to be filed down even with the holder and when the whole outfit was fastened together with filister head screws it made a good, substantial job.

I wish to add that I drove pins into one half of the heading die, allowing them to project about ¼ inch to enter the holes in the other half. After the punches were hardened they drove into the holder plate O. K. without injury to hole or punch. In Fig. 5 it will be noticed the end of punch is shown in dotted lines projecting about ¼ inch, this being so arranged to prevent any danger of becoming injured by clamping.

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The recent appointment of Assistant General Superintendent D. L. Bush as general superintendent of the C., M. & St. P. Railroad, to succeed J. M. Barr, is understood to be the result of a plan projected by the Milwaukee road whereby it will maintain its own locomotive shops in Milwaukee under the direction of Mr. Barr in his new position of assistant to the president. The shops at West Milwaukee, on which $1,000,000 has been expended in the last two years, will, with a few alterations, have a capacity of making from five to seven locomotives a month. At present the shops are turning out from ten to fifteen freight cars a day and there appears to be no lessening of the demand for this class of rolling stock.

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The Puget Sound Iron & Steel Works, Tacoma, Wash., has leased the Hardy shipbuilding plant, on the Puyallup river, with the option of purchase. The large machine shop which has stood idle for months was started up a few days ago. John L. Roberts, president of the company, declines to say at this time what the plans are for the future. The machine shop is well equipped, and a force of men was put to work finishing sundry parts of machinery from the company's main plant at the head of the bay. It is understood that the number of men employed will be increased gradually.

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The Badger State Machine Co., Janesville, Wis., has turned out its first machine, a combined punch and shear, which was shipped to Chicago a few days ago.

## GERMAN INDEX CARDS.

BY ROBERT GRIMSHAW.

Following the descriptions of German index cards published in *The Iron Trade Review* for Jan. 1, I give herewith a number of others of the "Duca" system, published by Max Sponholtz, of Berlin.

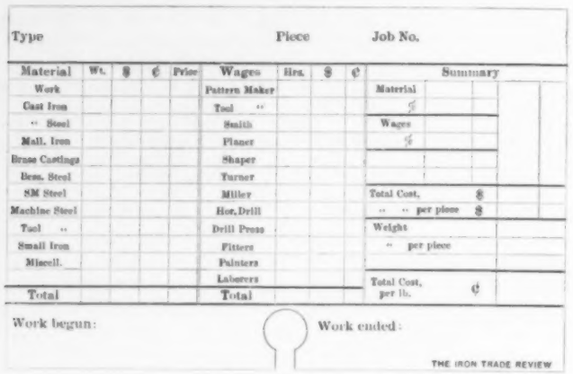


FIG. 1.—COST ESTIMATING CARD,

A "Customer's Card" in use by the Maschinenfabrik am Rhein has one side arranged as follows:

Firm .....
.....
City or Town.....
County, State or Country.....
Branch .....
Interested in .....
.....
.....
.....
Date .....Rating.....

The back of the card has:

PRINTED MATTER SENT.

No. .....
Date .....
Orders .....
.....
.....

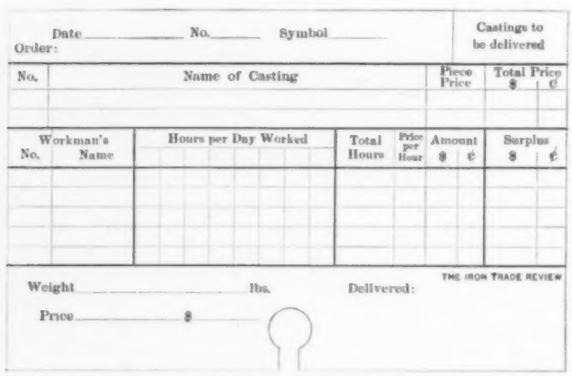


FIG. 2.—ESTIMATING CARD FOR FOUNDRY.

The front of a card used by a South German machine shop for estimating cost is illustrated in Fig. 1. The back of the same card is arranged as follows:

Type.....Job No. .....

Dimensions and Description:

.....
.....
.....

| Date. | Shop No. | Order No. | Delivered. | Net Wt. | Gross Wt. | Price. | Price per kg. |
|---|---|---|---|---|---|---|---|

.....
.....
.....
.....

Another card used for a similar purpose is arranged as follows:

Order No..... Part.....

| Pieces. | Articles. | Drawing List No. | Pattern No. | Wages. Each | Wages. Total | Material. Kind | Material. Weight | Price | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Work Card No..... Estimator.....

The weight in the column under material is divided for each item and entered as "Finished" and "Unfinished."

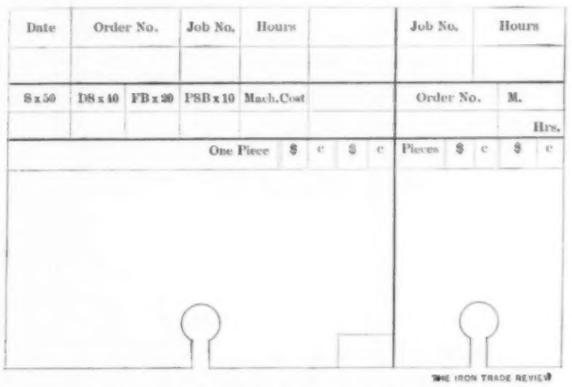


FIG. 3.—DAILY RECORD OF COST OF CONSTRUCTION.

An estimate card employed by another machine shop has the back almost identical with Fig. 7 on page 66 of *The Iron Trade Review* for Jan. 1. The face of the card is as follows:

Machine No.....

Type ..... Order No.....
Description .....
.....
.....
.....
.....
Work Commenced.....Work Finished.....

Sold.

Date .....
Buyer .....
Price .....
Date .....
Buyer .....
Price .....

Fig. 2 is an estimate card arranged for foundry use. Fig. 3 is from a concern making signal apparatus and is employed for the daily control of the cost of manufacture. When filled out

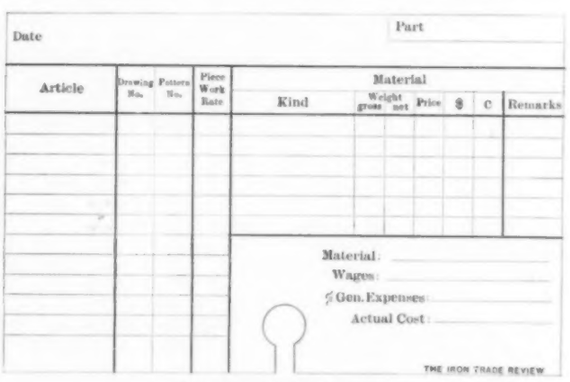


FIG. 4.—ESTIMATE CARD.

it is cut apart through the vertical line. The left hand or larger part is indexed under the order number and used for estimating cost, while the right hand portion is put under the workman's number and used in calculating the wages due him.

The cards illustrated in Figs. 4 and 5 are in use by a firm building river steamboats.

A card designed for the record of suggestions submitted for

alterations in a machine, building or bridge is arranged as indicated, the other side being left blank for a sketch, should this be desirable.

Mach. Cat. No..... Sheet No..... Part No.....
Suggested Alterations.....
.....
.....
.....
Reasons .....
.....
.....
Date..... Name.....

Order No. Part

| No. Pieces | Article | Drawing No. | Pattern No. | Wages Per Piece | Wages Total | Material Kind | Material Weight unf. | Material Price each $ | Material Price each ¢ | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
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| | | | | | | | | | | |

Workman's Card No. Estimates:
Signature

THE IRON TRADE REVIEW

FIG. 5.—ANOTHER ESTIMATE CARD.

A form for cataloging or indexing construction drawings is somewhat as follows:

Type..... Name..... Drawing No.....
Part..... Original. Tracing.
.....
.....
..... Blueprint. Mtd. Bp.
.....
.....
.....
Date Fin. Drawing.....
Name .....

## Cincinnati Machinery Market.

CINCINNATI, May 4.—Reports regarding trade conditions in machinery and machine tool manufacture are uniformly of the most cheerful tenor. The demand for machine tools shows no abatement and the orders in the past four months have exceeded any previous volume of business for an equal period in the history of the trade here. There is confidence on the part of the manufacturers in the continuance of present conditions and nothing now appears to disturb the satisfactory situation. There has been no change in prices. May 1 has passed with no sign of labor troubles and so far as can be learned employers and employes are on amicable terms.

The demand for machines continues of a well distributed character, but railroad shops and electrical supply manufacturers are notable buyers. The demand for motor-driven machines continues to show an increasing popularity for this style of equipment despite increased cost. Some of our machinery manufacturers are turning out their first motor drives this month, having been forced by the demands of purchasers to make motor driven tools.

Confidence in the continuance of good business and the effect of well filled order books appear in prospective additions to plants as well as by additions to shops in process of erection, purchasing of new machinery and the general spirit of progressive activity which accompanies prosperity.

The Rahn-Mayer-Carpenter Co. is just completing its new warehouse which adds 6,000 square feet of floor space to its plant. The quarters formerly used as a warehouse are being fitted up with traveling cranes and other facilities to make up an erecting shop. The company reports plenty of orders and finds increased facilities necessary to keep up with the business in sight.

The Cincinnati Milling Machine Co. is adding two additional stories on the front wing of its large plant. The floors of the addition will be 40x120 feet. The company is also installing additional power plant consisting of a 150-k. w. direct connected generator. These additions are accompanied by additional machine tool equipment. It goes without saying that the company finds business and outlook excellent in its line. The men in the shops sent in a signed expression of thanks, on the adoption of the 55-hour per week working schedule, expressing the "hope that the good feeling between employers and employes will continue."

The Cincinnati Planer Co. reports plenty of orders well distributed throughout the country. Among the many in hand and received recently are those from the Pennsylvania Railroad, the Nordberg Manufacturing Co., of Milwaukee, the Lodge & Shipley Machine Tool Co., the Queen City Machine Tool Co., the Chambersburg Engineering Co., Campbell Printing Press Co., Western Tube Co., and Western Railway of Alabama.

The Lodge & Shipley Machine Tool Co. reports orders about 33 percent in excess of its immense capacity. Orders from railroads and electrical shops are particularly heavy. In the past month the company has taken orders for 40 machines from railroads alone. The outlook for business continuing is regarded flattering. The president of the company, Wm. Lodge, holds the opinion that the necessity for replacing worn out equipment of the railroads and providing additional facilities and equipment to transport the large volume of business carriers will be called upon to move in this country, will require continuous purchases for railroad shop equipment. The ever-increasing use of electricity as a motive force and the disposition on the part of manufacturers to acquire up-to-date machines will keep machine tool makers supplied with orders from these sources. He also believes that with the awakening of prosperity abroad and the intelligent presenting of the merits of American made machines foreigners will be more liberal buyers. General conditions he believes are all favorable to continued prosperity in the machinery trade.

The Cincinnati Shaper Co. reports conditions entirely satisfactory and everything running smoothly.

With the John Steptoe Shaper Co. business is holding up remarkably well. An improvement in foreign demand is noticeable. The inquiry for motor-driven machines is increasing. The company will decide within the coming month what plan to pursue in erecting the addition to its plant. The reduction in working hours, it believes, will require the addition of several machines to keep up with orders.

Greaves, Klusman & Co. report orders coming in with satisfactory regularity and widely distributed, emphasizing the general prosperity of the manufacturers of the country.

The Bickford Drill & Tool Co. reports business strong, orders coming along nicely and the men in the shops happy over the new working hours. The company's men have sent a formal vote of thanks to their employers. With labor content and plenty of orders the company has nothing to complain of.

The Cincinnati Machine Tool Co. reports no let-up in orders and some foreign business; a few good orders in from France recently. Conditions are satisfactory and the outlook good.

The McIlvaine & Spiegel Boiler & Tank Co. is working along on its new building and change to electric motor power for driving machines, but finds it difficult to handle the number of orders coming along, and make shop changes. Progress on the latter is therefore rather tedious.

The Bullock Electric Manufacturing Co. entertained the Business Men's Club at its plant at Norwood on Saturday, April 25. The visit was on the invitation of Mr. James W. Bullock, vice president of the company. There was a large attendance regardless of a heavy downpour of rain. Mr. Bullock welcomed the guests in the restaurant of the company and later they were taken through the plant. A generator was seen under construction that will be of 5,000 horsepower and will weigh 350 tons. A direct connected generator of 5,000 horsepower for the Cincinnati Gas & Electric Co. will weigh 750,000 pounds. The company has orders on its books amounting to $800,000.

# The Western Machinery Market.

OFFICE OF *The Iron Trade Review*,
519 MONADNOCK BLOCK, CHICAGO, March 31.

Based upon reports and interviews with many manufacturers, it would appear that the wave of prosperity which apparently reached its highest point in March, has receded slightly during April. Many concerns report that they have noticed a falling off in the demand for their products, and while both production and consumption have been at high figures, the business transacted was not as great as was indicated by the sales and inquiries of previous months. Many causes are named for this condition, but the most common one is the fear of labor troubles. It is natural, with so much uncertainty as to what the future will bring forth, with conferences being held almost daily between manufacturers and their employes for the settlement of wage and labor questions, that the former should withhold their orders for supplies and equipment. The fear is expressed by many business men that unless the unions call a halt soon, they will kill the goose that lays the golden egg. Already prices of finished products have been advanced 10, 20 and 30 percent beyond what they were two years ago, and further advances will be necessary if the demands made by the unions are granted. Foundrymen in Chicago have generally agreed within the last two weeks on a 12½ percent advance in the cost of castings, in view of the advance that will have to be paid over last year's contract price for pig iron, as well as the labor advances that have come in the year, and this, together with the demands of the molders, has for the present killed off considerable business. It is a common report that the demand for castings either for machine or structural work is not as great as it was a year or two years ago. A second cause commonly stated is the high cost of materials, especially in erecting work, this having induced many concerns to abandon for the present plans for the enlargement of their plants.

Charles H. Besly & Co., Chicago, manufacturers of tools and machinists' hardware, report that trade is excellent, the demand for its line of goods being larger than ever. The company recently moved into its new store building at 15-21 Clinton St., which has double the floor space of the old building. Shipments of Gardner grinders have been made during the month to Austria, Canada, and to all parts of the United States.

The Chicago House Wrecking Co. advises us that while there is no marked improvement, the condition of the machinery and iron business is on a par with what it was a year ago. The outlook for trade is good.

The Winslow Elevator & Machine Co., Chicago, has just placed on the market a new electric freight elevator and is completing a push button control electric machine for light lifts for libraries and residences, two of which are to be installed in the Ryerson Library at Grand Rapids, Mich. The company states that it is receiving many inquiries for figures on elevators—more than for some time past—and that within the last 30 days it has shipped two 70-ton ice machines to South Africa and also received orders for two 100-ton and two 50-ton machines. Within the next sixty days it will be in the market for several new tools.

The Maywood Foundry & Machine Co., Chicago, reports that there is a good demand for Maywood molding machines. Orders have been received during the month from the McConway & Torley Co., Pittsburg, for coupler machines; from the Westinghouse Electric & Mfg. Co., for large round machines for making brackets for generators and motors; from the National Transit Co., for five sets of machines and nine sets of patterns for making various sizes of fittings. Shipments have also been made of machines to the Bullock Electric & Mfg. Co., the Buffalo Brake Beam Co., and others.

Chicago Pneumatic Tool Co. has received a number of orders for pneumatic equipment since the conclusion of the litigation commenced some time ago against infringers of its patents. Among these contracts were the following: The Lake Shore & Michigan Southern Rail Road, for the entire equipment for the new Collinwood, O., shops and others on its system; Wabash, Delaware & Hudson; Central Railroad of New Jersey; Cambria Steel Co., Johnstown, Pa.; Baldwin Locomotive Works, Philadelphia; Maher & Flockhart, Newark, N. J.; American Bridge Co., Newark, N. J.; American Car & Foundry Co.; Great Lakes Engineering Co., Detroit; Lackawanna Steel Co., Buffalo.

New Albany Mfg. Co., New Albany, Ind., finds a good demand for stone and quarrying machinery, having enough unfilled orders on its books and contracts pending that will keep its shops busy for another year at least. Stone planers of large dimensions have been shipped and set up recently at the works of the Peter & Melcher Steam Stone Works, Louisville, Ky., Peter & Burkhart, Louisville, and the National Stone Co., Bloomington, Ind., and a steam traveler at the quarry of the Bedford-Bowling Green Stone Co., Memphis Junction, Ky. An extension to the company's shop of 75x85 feet has just been completed, increasing the floor space to a total of 16,000 feet.

Hoefer Mfg. Co., Freeport, Ill., advises us that sales of its line of drills has been satisfactory, and that the business outlook is encouraging.

Hill Tool Co., Anderson, Ind., manufacturers of tool holders, did a larger business during April than in any other month in the history of the company. Good sized orders were received from the Pacific Coast, Canada, and from several foreign countries, the capacity of the company's shops being taxed to the utmost in completing same. The outlook is very encouraging, and if the labor cloud is solved without friction, it expects that 1903 will be its banner year. The company is now located in its new plant, and with a greatly increased capacity is in better position to promptly fill orders.

Fred J. Swaine Co., St. Louis, Mo., finds business very satisfactory and, judging from inquiries, believes that there will be no let up in the demand during the balance of the year. In April, a 10,000-pound drop press and power lifter was shipped to Minneapolis; one lot of power presses, with an outfit of dies and special tools to make air-tight heaters, to C. Sidney Shepard & Co., New York; complete outfit of dies, presses and special tools to make oil cams, stoves, tinware, etc., to Woods & Evertz Stove Co., Springfield, Mo.; one oiling machine to Wehrle Co., Newark, O.; one No. 4 power double seamer of 6,000 pounds weight to Warren Mfg. Co., Warren, O.; a line of open front presses to the National Enameling & Stamping Co., Granite City, Ill., and a number of smaller orders for presses, dies, etc., from concerns throughout the country.

E. E. Hanna, Chicago, manufacturer of portable screen shakers, machinists' vises, etc., is building a new plant, and will shortly have several new tools to place before the public.

Charles A. Stickney Co., St. Paul, manufacturer of gas and gasoline engines, says the demand from the agricultural districts has fallen off slightly, which it attributes to the fact that farmers are now busy seeding. Otherwise, it is well satisfied both with the volume of current business and the prospects for the future.

Atlas Engine Works, Indianapolis, Ind., report that trade shows a healthy and satisfactory growth, and that inquiries are very satisfactory in volume and character. Purchasers meet their obligations with promptness. The extensions to the company's plant recently completed, doubling the capacity, has enabled it to increase its product to cover all the demands for modern stationary and portable power plants.

Reeves Pulley Co., Columbus Ind., has let a contract for the erection of a new foundry shop, work on which is progressing rapidly, the machinery and equipment being already on the ground. Orders for Reeves variable speed transmission, it reports, continue to be received in satisfactory volume, and outside of probable labor troubles, it sees nothing to cause alarm in the business world.

Williams, White & Co., Moline, Ill., say that the demand for their line of tools is not as heavy as it was last year, though the business outlook is very fair.

McDonald & Morrison Mfg. Co., Dubuque, Ia., manufacturer of pumps, etc., is building a new warehouse, three stories high, 266x100 feet, also a rough stock and mill room, 100x60 feet.

Model Gas Engine Co., Auburn, Ind., is increasing the capacity of its plant by the erection of a building which will give it 15,600 feet of floor space additional, this extension being necessary since the company entered upon the manufacture of automobiles. Gauged by the present demand for its engines,

the company expects to do twice the business this year that was done in 1902, the outlook for trade never appearing so bright. During the month, carload shipments of engines of all sizes have been made to Denver, Los Angeles, San Francisco, San Antonio, Cedar Rapids, Omaha and Kansas City, besides export orders to South America and New Zealand.

B. F. Barnes Co., Rockford, Ill., is several months' behind in the shipment of orders, with apparently increasing demand. Large shipments have recently been made to Belgium, Holland and Switzerland, and consignments are being prepared for export to France, Germany, Italy and Austria.

Crawford & McCrimmon Co., Brazil, Ind., manufacturer of hoisting engines, steam pumps, ventilating fans for mines, etc., is working its plant to the fullest capacity, and is building an addition to the machine shop, increasing size of same by 6,000 square feet of floor space. The company is bringing out some improvements in its acid proof mine pump, with which hereafter it will be able to give an absolute guarantee. It reports a good demand for roofing tile presses, of which it began the manufacture in a limited way several years ago. Recent sales of mining machinery include the following: Atlas Coke Co., Uniontown, Pa., one pair 20x36 direct hauling engines; United States Coal & Coke Co., Pittsburg, 6 fans; Cardiff Coal Co., Chicago, one pair 24x36 direct hoisting engines; Garrett Coal Co., Meyersdale, Pa., one 20-foot fan, and 12x24 engine; Lilly Coal Co., Altoona, Pa., one 20-foot fan and 12x24 engine; Fairmont Coal Co., Fairmont, W. Va., 2 fans; Pittsburg Coal Co., Pittsburg, 6 fans; Davenport Coal Co., Ledford, Ill., one pair 18x32 direct hoisting engines, and one fan; Coal Bluff Mining Co., Terre Haute, Ind., one pair 18x32 direct hoisting engines; Superior Coal Co., Jackson, O., 2 fans; Jeffrey Mfg. Co., Columbus, O., two pairs of hauling engines and two fans.

Barnard & Leas Mfg. Co., Moline, Ill., while in receipt of a satisfactory trade, reports that the demand has fallen off in a measure from what it was a year ago. Its recent orders have been largely for remodeling flouring mills, some of which were important in their scope. The company intended this year to build a large foundry, but owing to the high price of labor and building materials and the fear of labor troubles it has postponed the matter for the present.

Stephens-Adamson Mfg. Co., Aurora, Ill., has sufficient work in hand to run its plant several weeks, and with the large number of orders pending, it anticipates a very busy season. A contract has just been closed for complete grain elevator equipment for an elevator being built by the Barnett & Record Co., Minneapolis, for the Canadian Pacific Railway at Port Arthur, Canada. Several other good sized orders for elevating and conveying machinery, belt conveyors, etc., have been closed during the month.

Anderson Tool Co., Anderson, Ind., reports that orders in the past month were fairly numerous and that the outlook seems good.

Bignall & Keeler Mfg. Co., Edwardsville, Ill., is placing on the market a new design of the Peerless special threading and cutting machine, capacity ¼ inch to 2 inches, inclusive. Orders have been more numerous in the month just closed than for some time past, among them being one for three Duplex No. 18 machines, capacity 8 inches to 18 inches, which it states is an unusual order for pipe work.

Hill Machine Co., Anderson, Ind., has recently made shipments of pumping machinery to the following points: Brazil, Ind.; Herbst, Ind.; Alliance, Ohio; Franklin, Ind.; Thatcher, Colo.; Providence, R. I.; Pittsburg, Pa.; Dunkirk, Ind.; Ridgeway, Ia.; Minneapolis, Minn.; Philadelphia, Pa.; Teutopolis, Ill.; Martins Ferry, O.; Knoxville, Tenn.; St. Paul, Minn., and Chicago, Ill.

Curtis & Co. Mfg. Co., St. Louis, Mo., is contemplating the erection of an entire new plant, which will have double the capacity of its present shops. The company reports that the demand for its line of machinery is constantly increasing, each month's sales showing a steady growth over those of corresponding months in the past.

New Doty Mfg. Co., Janesville, Wis., has in view the erection of a new foundry in the near future. It advises us that business during April was better than for some time previous, and, judging from the number of inquiries, it believes that the demand for punches and shears, etc., the rest of the year will be good. It has shipped a number of large machines during the month, among them being several for export, the orders for these having been received through New York exporting houses.

Helwig Mfg. Co., of St. Paul, manufacturer of pneumatic staybolt clippers, etc., is having such a demand for its tools that an addition to its plant is seriously considered. Orders have improved and the company's shops are taxed to full capacity to turn them out in the required time. Export trade shows a steady growth, orders being received from quarters so remote as to make it a source of wonder to the company that the inquirers have heard of its tools. Additional sizes of pneumatic motors are being brought out, and a wood boring end spindle motor, which is giving great satisfaction, has just been added to the line. The company expects soon to be equipped for the manufacture of drop forgings for the trade.

Lennox Machine Co., Marshalltown, Ia., has temporarily abandoned the plans for an extension to its plant owing to the unrest among labor unions. It reports that the demand for its machines has been greater this year than at any previous time in the history of the firm. Orders for furnaces have been received during the month for shipment to Streator, Ill.; Champaign, Ill.; Denver, Colo.; St. Paul, Minn.; Irwin, Pa.; Lincoln, Neb., and Davenport, Ia., and shipments of beveling and splitting shears have been made to the Lehigh Valley Ry., Sayre, Pa., and Buffalo, N. Y.; Milliken Brothers, Arlington Station, S. I.; Fort Worth Boiler Works, Ft. Worth, Texas; Tennessee Coal, Iron & Railway Co., Inslay, Ala.; American Fire & Engine Co., Seneca Falls, N. Y.; Southern Pacific Ry. Co., Beaumont, Tex.

Marinette Iron Works Mfg. Co., Marinette, Wis., reports that the demand for its engines is far in excess of the company's capacity, and that the prospects seem good for a continuance of these conditions. It has orders on its books for engines for shipment to all parts of the United States and several for foreign countries.

Union Steam Pump Co., Battle Creek, Mich., is making extensive additions to its power plant and foundry, necessitated by the increased demand for its machinery. It reports that business the past month was greater than for the corresponding period of 1902, and with good crops it believes these conditions will last the balance of the year.

Ransom Mfg. Co., Oshkosh, Wis., manufacturer of grinding and polishing machinery, has had a good spring trade and is satisfied with the business outlook. Its line of direct motor driven grinders, which are built in four sizes for 18 inch, 24-inch, and 30-inch emery wheels, will be increased in the near future by the addition of a machine for 12-inch wheels.

Whitehead Machinery Co., Davenport, Ia., reports that the volume of inquiries for steam power equipment is as good as in any year previous, and sales are brisk.

Shultz Belting Co., St. Louis, reports that the demand for its goods is greater than at any time last year. During the month it has shipped a large belt, 48 inches wide, three ply, to Stamford, Conn.; one 34 inches broad, 152 feet long, to New Jersey, and a large belt to Sherman, Tex., besides several to foreign countries.

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## American Society for Testing Materials.

Announcement is made that the sixth annual meeting of the American Society for Testing Materials will be held at Delaware Water Gap, N. J., on July 1, 2, 3, 1903. The program will be announced later. The membership has reached 325, representing an increase of 150 since the last annual meeting. The revised list of standing committees now consists of the following: On Standard Specifications for Iron and Steel, On Standard Specifications for Cast Iron and Finished Castings, On Standard Specifications for Cement, On Standard Specifications for Paving and Building Brick, On Preservative Coatings for Iron and Steel, On Bitumen, On Heat Treatment of Iron and Steel, On the Magnetic Properties of Iron and Steel.

The next congress of the International Association for Testing Materials, with which the American Society for Testing Materials is affiliated, will be held at St. Petersburg, beginning on Aug. 18, 1904.

## DOUBLE-CUTTING PLANER.

BY ROBERT GRIMSHAW.

There are so many cases where a planer could be used that would cut on the return stroke that it is a wonder we still stick to the old idea of making a cut on one stroke and coming back two or three times as fast without doing any work—as though that were any saving of time. Fifty years ago there were used in some of the large shops in both England and America, "Jack-in-the-box" planers in which the tool, after cutting on one stroke, made a semi-rotation and performed the same duty as the table came back. The reason for abandoning this principle probably lay in the "Jack" itself, and not in any false action of the cutting mechanism. If the cross-beam is made to resist stresses from one side only, due to a tool working on a left-hand stroke of the table, it may not—I do not say it will not—be stiff enough to resist exactly the same stresses on the right-hand or return stroke. But that is no reason why it can not be made to do so. [Note in this connection the Sellers patent described in this issue in "New Things for the Shop."—ED.] The use of two saddles and two tools on one cross-beam was an advance, as regards capacity, but necessitated stronger construction of the whole machine, and a more powerful drive, and the present practice of putting two heads on the beam and two more on the side pieces requires still greater driving power. But the two principles of increase of capacity are entirely independent of each other, and may exist at the same time on any machine; only where but one of them is chosen, that of working on the return stroke is preferable, because it calls for a more simple return feed and requires no increase in the strength of the parts and none in belt width. And this principle once established, there is nothing to prevent its being "duplexed," so that planers can cut with two or four tools at once and on both strokes at the same table speed.

### Rochester Metal Trades Association.

The Rochester Metal Trades Association, Rochester, N. Y., has been incorporated. The purposes of the corporation as set forth in the certificates are to foster the interests of those persons, firms and corporations engaged in the metal trades in the city of Rochester, N. Y., and vicinity, to reform abuses relative thereto, to secure freedom from unjust or unlawful exactions, to diffuse accurate and reliable information as to the standing of merchants and other matters, to procure uniformity and certainty in the customs and usages of said business, to settle differences between its members, and to promote a more enlarged and friendly intercourse between them.

The incorporators are representatives of the following concerns: W. A. Wilson Co., W. P. Davis Machine Co., The Judson Governor Co., The C. J. Palmer Co., Modern Laundry Machinery Co., The Gleason Tool Co., The Judson Pin Co., Knowlton & Beach, S. B. Truesdale & Co., Clark Novelty Co., Seager Gear Co., Pneumatic Signal Co., John Werner Machine Works, Rochester Machine Tool Works, J. Emory Jones, T. R. Baxendale, Rochester Gas Engine Co., Rochester Barrel Machinery Co., Charles Bridgeford, Charles Englert, Jr., E. C. Brown & Co., Boath Brothers, Rochester Electric Motor Co., Riggs-Spencer Co., F. H. Clement Co., Morgan Machine Co. These comprise all concerns engaged in the manufacture of machinery and metal work at Rochester.

A party of officials of the United States Steel Corporation and the National Tube Co. made an inspection of the plant at Lorain, O., April 30th. Included in the party were William B. Dickson, second vice president of the United States Steel Corporation; Wm. B. Schiller, president of the National Tube Co., and other officials of that company. The site of the new tube mill was visited and an inspection of the river was made. President Schiller said that he thought it not at all unlikely that over 2,000 men would be added before fall to the number employed by the Lorain Steel Co. The preliminary work of erecting two new blast furnaces is progressing nicely.

The American Car & Foundry Co. is stated to have business on hand aggregating fully $50,000,000. In March its orders were more than double its monthly capacity.

# INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

### New Buyers in the Market and Some of Their Wants:—

The Jewel Furnace Co., capital $10,000, has been organized at Elkhart, Ind. The officers are as follows: President, L. R. Boyle; vice president, Benj. Butler; secretary and treasurer, Harvey J. Bostwick.

The Springfield Mechanical Boiler Cleaner Co., Springfield, O., has been incorporated with a capital of $50,000. The company will manufacture a device for the removal of scale from boilers.

The G. Matthison Machine Works, Beloit, Wis., has been incorporated with a capital of $25,000.

The Albany Industrial Co., Albany, N. Y., capital $40,000, has been incorporated to manufacture engines, boilers and furnaces.

The Vulcan Foundry Co., Cincinnati, has been incorporated with a capital of $25,000.

The Chicago Malleable Steel Range Co., Chicago, has been incorporated with a capital of $60,000.

The Columbus Wire & Iron Works, Columbus, O., has been incorporated with a capital of $30,000 to manufacture and sell wire, iron, steel elevator cars, enclosures of all kinds of wire goods, and hitching posts.

The Coleman Iron Works Co., Elmira, N. Y., has been incorporated with a capital of $3,000.

The Hillsdale Steel Boot Co., capitalized at $60,000, has been organized at Hillsdale, Mich. The directors and officers are: Directors, F. M. Stewart, J. W. Marvin, Dr. W. H. Sawyer, T. M. Fant, Geo. N. Smith, C. E. Singer, E. J. Geulick, Geo. A. Horn and Nathan D. Lapham, and the officers are: President, F. M. Stewart; vice president, E. J. Gaulick; secretary and treasurer, T. M. Fant. The article to be manufactured is a steel boot or end gate for a wagon box. The company expects to start as soon as the necessary machinery can be installed, and will probably be located in the building formerly occupied by the Alamo Engine Co.

The Louisville Cornice Co., Louisville, Ky., capital $10,000, has been incorporated by seventy-five citizens of Louisville.

The Penn Novelty Co., Canton, O., recently organized with a capital of $10,000, has purchased the patents, machinery and equipment of D. F. Long, of Canton, and will begin at once to manufacture velocipede wagons (fully protected by patents) and other novelties. The company is in the market for castings, rod steel wires, sheet iron, metal wheels, oil, paint, varnish, enamel, small lumber, machinery and tools. It proposes to increase its capital and capacity within the year and at that time add the manufacture of metal wheels and a line of children's vehicles.

The Standard Iron, Coal & Lumber Co. has been incorporated to work mineral lands in West Virginia. It has a capital stock of $250,000 and the following directors: Charles J. Nasmyth, Daniel L. Hardenbrook, T. S. Atwater, Albert Von Tilzer and H. Lyon Smith. The company has purchased 1,200 acres of land on the Elkhorn Creek, close to the line of the Norfolk & Western road, and will shortly begin mining for iron and copper. Leases have also been taken on 60 acres of land in Troy, Bradford County, Pa., where coal mines are already in operation.

The Columbia Boiler & Foundry Co., Indianapolis, has been incorporated with a capital of $75,000. The directors are: George S. Row, Thomas C. Rutledge, O. M. Simmons, A. J. Simmons and H. W. Hopkins.

The Automatic Car Brake & Supply Co., Utica, N. Y., has been incorporated for the manufacture of the Brandau automatic safety brake. The officers are: President and general manager, George F. Brandau; vice presidents, Fred P. Wagner and J. W. Scheer; secretary, William J. Griffiths; treasurer, Wendolin J. Bach.

The Graham Iron Co., Duluth, capital $20,000, has been incorporated by James Wanless, Chester A. Congdon and Lee W. Farmer, all of Duluth.

The Wolverine Saw Co., Detroit, has been incorporated with a capital of $5,000 to manufacture, sell and repair saws.

The Interstate Machine Co., of New York City, capital

$500,000, has been incorporated. The directors are: Gabriel Hyman, Gertrude Hyman and E. H. White, of New York City.

The contract for the building of a new railroad in the State of Michoacan, Mexico, has been let and the rails, locomotives, cars and other equipment are expected to be ordered very soon. The line is to be operated by the Morelia & Tacambaro Railroad Co., which has been incorporated under the laws of New Jersey, with a capital of $6,000,000. A. J. Peyton & Co., 69 Wall St., New York, obtained the concession from the Mexican authorities for the building of the road. It will be 225 miles in length, and will cost about $2,500,000 for construction and initial equipment.

Western Boiler Works, of Denver, Col., has been incorporated with a capital of $100,000. The incorporators are: Harry A. McIntyre, Milford T. Gass, Carroll Owen, F. A. Williams, F. C. Adams, Denver, Col.

The Fairbanks Steam Shovel Co., Pierre, S. D., has been incorporated with a capital of $200,000.

The Art Metal Construction Co., Jamestown, N. Y., capital $2,500,000, has been incorporated to manufacture furniture and office and vault fixtures. The directors are: A. C. Wade, of Jamestown; P. J. Pauly, Sr., and Geo. D. Barnard, of St. Louis; William Gender, of Milwaukee, and Carl F. Lamb, of Rochester.

The Dayton Gas Engine Co., Dayton, O., capital $100,000, has been incorporated by W. F. Bakhaus, P. F. Henn, C. F. Griffith, H. K. Scott and F. E. James.

The Pettit Ornamental Iron & Fence Co., of Ambler, Pa., is to be succeeded by a new corporation to be known as the Cruse-Kemper Co. The capital will be $150,000. The new company will be incorporated for the manufacture of gas holders, oil and water tanks, steel water towers and light structural steel work of the general character. Officials will be as follows: Arthur R. Cruse, president; Frank Flavell, secretary, and Aaron E. Kemper, treasurer. The capacity of the present plant will be largely increased.

An important addition to the industries of New Haven, Conn., is the Omega Steel Co., which has just taken over the National Tool Co., of that city, a concern organized on a modest scale some time ago to manufacture lathe and planer tools. Extensive improvements and additions are contemplated. The authorized capital of the Omega Steel Co. is $3,000,000. Among those interested are the following, who are the officers and directors: Charles J. Benham, president and treasurer; Charles Hudson, vice president; Robert Dunlop, secretary, New York; directors—Charles J. Benham, New Haven, Conn.; George W. Nock, New York; Dwight Blakeslee, New Haven; Charles Hudson, New Haven; Frank Bayless, New York.

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**Fires and Accidents:—**

The foundry of D. R. Sperry & Co., Aurora, Ill., employing one hundred men, was burned last week, resulting in a loss of $50,000.

Fire in the plant of the Middletown Iron Works, Middletown, N. Y., resulted in a loss of $8,000.

An explosion in the gas plant of the Morden Frog & Crossing Works, Chicago, April 28, caused a loss of $500 from fire and $800 from the explosion. Machinery was not extensively damaged, as reported in the newspapers.

The advantage of having a fire brigade in large manufacturing plants was shown on the morning of April 29th at the works of the National Tube Co., Syracuse, N. Y. The roof of the welding furnace fell in and the flames threatened to cause a fire of great proportions. Within a minute the men had five streams of water playing on the fire, which was extinguished before any damage except a little to rafters was done.

The Hammond Iron Works, Warren, Pa., was damaged to the extent of 3,000 by fire April 29th.

The Traverse City Iron Works, the most extensive iron works in northern Michigan, was destroyed by fire April 27th; loss $20,000, insurance $16,000.

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**New Construction:—**

Plans are under way in the engineering department of the Pittsburg & Lake Erie Railroad for the construction of a machine shop and rest house at Hazelton, O. The machine shop will be 65 x 150 feet and will cost about $100,000. The rest house, for the accommodation of the trainmen, will contain sleeping rooms, bath rooms, and other conveniences for the men who are compelled to remain over at Hazelton on their trips.

T. L. Griffith, officer of the firm of Hill & Griffith, manufacturers of foundry supplies, of Cincinnati, contemplates the erection of a plant for the manufacture of foundry supplies at Hamilton, O.

Kerney & Trecker, Milwaukee, manufacturers of machinery, have decided to erect an addition to their plant.

Orson W. Davis, Adrian, Mich., has purchased a site and will erect a machine shop this summer.

The large plant of the Railway Steel Spring Co., which is being erected in East St. Louis, Ill., is rapidly nearing completion, and the plant will probably commence operations about July 15th.

The Wier Frog Co., Cincinnati, has closed a contract for a site in the industrial belt in Norwood near Cincinnati, and will build a new plant.

The Fox Typewriter Co. will build a large addition to its plant at Grand Rapids, Mich., so that it will be able by September 1st to turn out 25 completed machines a day.

The Stowell Mfg. & Foundry Co., South Milwaukee, has just completed a $25,000 addition to its malleable foundry and is building an addition to the machine shop at a cost of $8,000.

The Soo Railway Co. has taken out a permit for a $30,000 addition to its shops in Minneapolis. Work has already been begun on the new building.

The Crown Iron Works, Minneapolis, will build a new plant to consist of a foundry, blacksmith shop, power house and office building. Ground has already been broken for the foundry. About seventy-five men are employed at the present plant and nearly 200 will be given employment when the new construction is finished.

S. Green & Sons, foundrymen, Des Moines, Ia., will build additions to their plant, which will double the output of the concern.

The material for the new steel car plant to be erected at Altoona by the Pennsylvania Railroad Co. is being assembled. The foundation of the plant is almost completed.

The work of rebuilding the foundry recently burned at the Bates Machine Co.'s plant, Joliet, Ill., is proceeding favorably. The new building will be 100 x 200 feet, brick, two stories.

The Ludlow Valve Mfg. Co., Troy, N. Y., has acquired from the United States Steel Corporation a part of the property which formerly belonged to the Troy Steel Products Co. The valve company will build a new foundry 380 x 150 feet, and will erect a number of auxiliary buildings. The enlarged plant will, it is expected, employ six hundred men, an increase of two hundred over the number now employed.

The Conneaut Can Co., Conneaut, O., will erect a new building 40 x 175 feet, and will make other improvements.

The Monitor Forge & Iron Co. will erect a plant at Sandusky, O. At the outset, 35 men will be employed.

T. B. Wood's Sons, Chambersburg, Pa., are building a new addition to their foundry and also an addition to their machine shop.

Work on the new Gould Steel Plant at Depew, N. Y., was begun April 28th when the excavation for the foundation was started. The company will manufacture steel couplers.

The Buffalo Structural Steel Co., Buffalo, N. Y., will erect an addition at a cost of $18,000.

Cheney Brothers, South Manchester, Conn., have had plans prepared for expensive additions to their plant. Two machine shops, one 169 x 50 feet and the other 100 x 23 feet, will be built. An office and several other minor buildings will be erected.

The Moundsville Mining & Mfg. Co. proposes to build and equip a plant at Moundsville, W. Va., provided financial support is guaranteed by people of Moundsville and vicinity.

The largest steel mill in inland Pennsylvania was completed a few days ago by the Eastern Steel Co., at Pottsville. As the last truss was put in place a large silk flag was unfurled from the apex of the building amid the cheers of the officials and workmen.

Work on the new plant of the Herron-Brady Pump &

Foundry Co., Chattanooga, Tenn., is progressing rapidly and the foundry will be in operation in about five weeks. James Brady, the manager, has closed a contract with the Coons Export Milling Co. for machinery costing $12,500 to be used in the cotton mill at Lafayette, Ga. The company has also secured a contract for the building of a large amount of machinery to be used on sugar plantations in Mexico.

An appropriation of $300,000 has been made by the Louisville & Nashville Railroad for the construction of switch yards, shops and a roundhouse on the property of that road near Boyles, a few miles north of Birmingham, Ala. There will be a machine shop, car shops, blacksmith shop and a small foundry.

The American Seeding Machine Co. will build an addition to its office in Springfield, O., and also build a foundry and warehouse.

Additions and alterations to the forging shop of Henry Disston & Sons, Tacony Station, Philadelphia, will be made at a cost of $61,000.

The Terre Haute Shovel & Tool Co., Terre Haute, Ind., whose plant was destroyed by fire April 8, informs us that its plans for rebuilding are nearly completed and that it expects to start construction work the latter part of this week.

Ground has been broken at the foot of West First Ave., in Columbus, O., for a factory in which to manufacture a new angle power transmitter designed by Prof. Robinson, professor emeritus at the Ohio State University. The plant is expected to be in full operation in ninety days.

**Pittsburg District and Western Pennsylvania:—**

A. R. Hunt, general manager of the Duquesne works of the Carnegie Steel Co., was surprised to receive, a few days ago, the resignations of Thos. F. Davies and his brother, John R. Davies, the former superintendent of the roll turning department and the latter having a similar position in the rolling mill department of the Carnegie works. The Davies brothers had been in the steel business for almost fifty years, and had been with the Carnegie company over twenty-five years. They will hereafter engage in farming.

A plot of land containing about 52,000 acres and having large deposits of manganese, has been leased in West Virginia by A. W. Renwick, of Pittsburg, and several business associates. It is reported that they have been offered a large amount for the property.

William B. Schiller, president of the National Tube Co., and a number of other officers of that company, inspected the plants at McKeesport last week. The McKeesport Drilling Co. has a large force of men at work drilling test holes to ascertain the depth that the company will have to go for foundations for the new blast furnace and rolling mills. The exact location on the new site will not be known until the tests have been completed. President Schiller says that the actual work on the new mills will be started within sixty days.

The new manual training school at Homestead, which owes its existence to the liberality of Chas. M. Schwab, will be dedicated May 16th. Mr. Schwab will be present.

All the officers of the Jones & Laughlin Steel Co. were reelected at the annual meeting last week. These officers are as follows: President, B. F. Jones, Jr.; vice president, Willis L. King; general manager, William Larimer Jones; secretary, W. C. Moreland; treasurer, Irwin B. Laughlin; assistant treasurer, T. K. Laughlin; directors, B. F. Jones, Henry A. Laughlin, George M. Laughlin, James Laughlin, Jr.; B. F. Jones, Jr., Willis L. King, William Larimer Jones, James B. Laughlin, Irwin B. Laughlin, Thomas O'Connor Jones, Roland Gerry, W. C. Moreland, Robert Geddis, W. W. Willock and H. S. Kiehl.

**General Industrial Notes:—**

The property of the Worcester Steel Works, Worcester, Mass., was sold a few days ago. John A. Bowers, of Bayonne, N. J., was the purchaser, bidding $36,000 and assuming the mortgages amounting to $80,000. The property consists of several old buildings and about five acres of land near Worcester. The works were started in the 40's and for many years manufactured steel rails. Several years ago, being unable to compete with western concerns, this one went out of business. It is not known what use will be made of the property, but it is understood that the Boston & Albany Railroad is negotiating for its purchase.

The Griffith Wheel Works, Tacoma, Wash., is crowded with orders, and is now shipping many wheels and castings to British Columbia. It has recently largely increased its output.

The new foundry of the United Pump & Supply Co., Toledo, which is a combination of the Standard Pump Works and the Lucas Pump Works, of Toledo, and the Dean-Chamberlin Co., of Hudson, Mich., is now in operation.

The Parry Machine Co., Rochester, N. Y., recently incorporated, intends to develop and build certain machines for paper box manufacturers' use. It does not anticipate any move with regard to change of quarters and will install very little new machinery. It is the continuance of another business.

The Rand Drill Co., N. Y., through its pneumatic tool department, reports the recent sales of many large complete air plants, including the new "Imperial" Pneumatic Hammers and Piston Air Drills, also that the business in pneumatic tools has surpassed most sanguine expectations. Plans are now being drawn for an extensive enlargement of the Rand Drill Co.'s works to meet these increased demands.

The Ohio Automatic Machine Co., Oberlin, O., recently incorporated, does not intend to manufacture, but will conduct an agency only for the present.

The Corbin Screw Co., New Britain, Conn., recently incorporated with a capital of $400,000, is a consolidation of the Russell & Erwin Co. and the P. & E. Corbin Screw Co.

The Wabash has placed an order with the American Car & Foundry Co. for 1,500 steel coal cars, to be manufactured at the Madison, Ill., plant. The order calls for delivery in the early part of 1904. The equipment will be used on the Pittsburg line. Similar orders have been placed by the Wabash for the equipment of the Wabash proper.

H. S. Burroughs, Onalaska, Wis., has purchased the plant of the Gateway City Steel Tank & Roofing Co., La Crosse, Wis., and will be manager of the company.

A large order for machine tools was placed in New York recently by the Chicago, Rock Island & Pacific Railroad for its new shops at Moline, Ill. The list amounted to about $100,000 and was secured principally by the Niles-Bement-Pond Co., Manning, Maxwell & Moore and the Marshall & Huschardt Machinery Co.

The Todd Mfg. Co., New Albany, Ind., has purchased from the Fidelity Trust Co., trustee, all the machinery and material in the Lithgow Mfg. Co. buildings, Louisville, Ky., which plant has not been operated for a year. The Todd company will make an addition to its plant in New Albany, Ind., having secured the old Monon shops, and all the machinery from the Lithgow plant that can be used will be retained. The remainder will be sold.

The new Ft. Wayne Wind Mill Co., Ft. Wayne, Ind., is experimenting with a gas-making machine which supplies a substitute for natural gas made from crude petroleum.

The new addition to the open-hearth department of the Harrisburg Pipe & Pipe Bending Works will be completed in about sixty days. The other departments are in operation. A great deal of business is being done.

The Western Steel & Wire Co., of Kansas City, Kas., is now installed in its new plant at Armourdale, Kas. It has recently purchased the patents, property and business of the New Century Hay Press Co., and is taking up at once the manufacture of the press on a large scale.

The Weimer Machine Works Co., of Lebanon, Pa., has booked the following orders for its patented cinder cars, with cast steel trucks, and to be operated by E. A. Weimer's patented dumping cylinder, using air or steam taken from the locomotive: Illinois Steel Co., South Chicago, Ill., ten cars; Joseph Wharton, Wharton, N. J., four cars. The following orders are for hand dumping cars, with patented cast steel trucks: Sheffield Coal & Iron Co., four cars; Illinois Steel Co., Joliet, Ill., two cars; Richard Heckscher & Sons Co., Swedeland, Pa., one car. The company is at present building a number of hot metal cars for the Carnegie Steel Co.; Mingo Works, Joseph Wharton, Bethlehem Steel Co., and the Hamilton Iron & Steel Co.; also a number of scrap cars for the open-hearth furnaces, and for the blooming mills of the different works of the Carnegie Steel Co.